VOLUME III

APPENDICES

Joint Provincial Courseware
Cataloguing and Indexing
Project

JEM Research
June/1982.

APPENDIX VI

CLEARINGHOUSES - EDUCATIONAL RESOURCES

INTRODUCTION

The following is a partial list of organizations involved in the collection and dissemination of information about educational resource materials.

Most provinces in Canada have media centers or resource centers that collect various forms of media and/or information about them. They are evaluated by the Ministry of Education, then organized and distributed to schools in the province.

The difference between these two types of organizations is that the former concentrates on information about products available while the latter actually collects materials, but only those which are recommended or prescribed by the individual Ministries of education.

E.P.I.E. (Educational Products Information Exchange)

EPIE provides information on educational material. Its purpose is to help educators select wisely from among the growing number of educational products and to help teachers make the most effective use of instructional materials. The institute provides a cost-sharing information service to educational consumers throughout Canada and the United States. Alberta, Manitoba and British Columbia are part of the Canadian EPIE exchange.

The EPIE system is based on an instructional framework, using a common language and common system. The system looks at materials to determine:

1) intents
2) contents
3) methodology
4) means of evaluation

ERIC (Educational Resources Information Center)

Eric is a clearinghouse for information resources. Its purpose is to disseminate as widely as possible information about timely and significant materials of interest to the educational community. Documents are announced monthly in the abstract journal of the ERIC system. Resources in Education (RIE). These are made available to users in microfiche and paper copy and sold through the ERIC Document Reproduction Services (edrs). Credit is given to the source of each document, and a reproduction release may be granted. In addition, ERIC provides an index to educational literature available in published journals. Abstracts are available in the Cumulative Index to Journals in Education (CIJE).

FORMAT

FORMAT is a fully bilingual national computerized audiovisual information system. It provides comprehensive information about relevant Canadian film material and plans to eventually accommodate all audiovisual products. The database is organized according to international audiovisual library standards. Information from FORMAT is currently available in hard-copy and will soon be available in an online mode to meet specific requirements of its users.

FORMAT, a central data bank and retrieval system provides

1) bilingual access
2) easy subject/content searches for films
3) national coverage of materials
4) shared cataloguing facilities
5) information on where to book films available from private Canadian distributors
6) film previewing for rental or purchase
7) feedback; allows for a flow of information back and forth between users and cataloguers, which ensures up to date and complete data.

FORMAT
National Film Board of Canada
Distribution Branch D-11
C.O. Box 6100
H3C 3H5
Montreal, P.Q.
(514) 333-4524

NICEM

The National Information Center for Educational Media, located at the Univeristy of Southern CA, has indexed, catalogued and disseminated information on nonprint educational materials since its inception in 1964. To date, fourteen major indexes have been developed and published, each arranged by subject and single media or multimedia volumes.

NICEM is available online through Lockheed Information Systems (DIALOG) service. Their current guides for formatting entries are: Anglo-American Cataloguing Code & AECT's (Assoc. for Education Communications & Technology) Standards for non print media. They have a number of searchable indexes online with eight bibliographic elements in each database entry.

NICSEM

Nicsem is one of the fourteen major indexes developed and published by NICEM. NICSEM was established in 1976 at the University of Southern California to develop a national bibliographic information retrieval system focusing on both print and non-print educational materials suitable for use with the handicapped.

NICSEM offers detailed information in a bariety of formats on media and materials resources. Entries in the index are selected by topic area (subject headings & sub categories) and audience level.

OECA

OECA is a provincial crown agency whose mandate is to provide educational opportunities to the residents of Ontario through the use of television and associated media. The OECA distributes 31,000 video recordings to Ontario school boards, post-secondary institutions and public libraries. Presently they catalogue their own materials online and are preparing for the development of an information retrieval system that will fulfill the requirements of its many diverse user groups.

Bibliographic standards for the OCEA file were developed using the Canadian MARC format for audio visual materials as the authority for the mediagraphic content & tagging structure of the standards. AACR2 is used as the standard for cataloguing. Library of Congress Subject Headings, Sears Subject Headings and Universite Laval Subject Headings are standards for content analysis. The material is file indexed by OECA's Basic Program Number (BPN) To date, over 11,000 video recordings have been catalogued and input to the UTLAS file.

OECA
Cheryl Zimmerman/Ruth Brass
The Ontario Educational Communications Authority
P.O. Box 200
Station Q
Toronto, Ontario
M4T 2T1
(416) 484-2600

SPIF

The School Practices Information File (SPIF) is produced by the BRS Education Service Group. The database contains descriptions of educational practices, programs, materials and products currently in operation or in use. Database citations refer users directly to the source materials. Included are descriptions of audiovisual materials, as well as microcomputer software and courseware listings.

Standard field designations of title, author, publisher, etc. are enhanced by fields which make selections of educational resources which are specific to user requirements much easier. These fields include:

EV - evaluation information
CP - contact information
AV - availability information
RT - resource type
GL - grade level
TG - target audience
AB - detailed abstract

Deborah Pietro
BRS/ESG 1200 Route 7
Latham, NY 12110
(518) 783-1161

APPENDIX VII

INFORMATION RETRIEVAL PACKAGES

INTRODUCTION

The following is a summary list of some software suitable for maintaining a database of information concerning educational software. Since selection of a delivery system is a suggested phase for further study, a detailed evaluation of each system will not be included in this report.

AUTO-INDEX

is software designed for indexing, it provides a range of features features and options that permit control over processing, output and format. These include:

1) standard null word list
2) word of phrase designation
3) selective document processing
4) cross-referencing (use KWIC)
5) adjustable context
6) control of format
7) field redefinition
8) index merge
9) intermix of datatype

Aspen software can be applied to a variey of databases, and is currently used by scientific and educational organizations.

Aspen Systems Cooporation
1600 Research Blvd.
Rockville, Md. 20850
(301) 251-5000

BASIS- (Batelle Automated Search Information System).

is a flexible method of handling and retrieving textual, bibliographic, and numeric information. Each record is indexed by relevant words, phrases and numerics, so that required information may be rapidly located, manipulated and displayed. A database would be custom designed in terms of file format. BASIS can accommodate as many fields as needed for retrieval. Other modules can be used for online inputting of records, to create a thesauras, to save searches, to sort output, and to monitor system usage.

INFORMART Head Office
164 Merton St.
Toronto, Ontario
M4S 3A8

BIBPRO IV - (Bibliographic MARC Record Processing System)

Software from BIBPRO allows for online search and retrieval, keyword indexes, subject, author cumulative indexes, and permuted subject indexes. Searching is assisted by online thesauri.

Infomatics In.
Information Services Group
IRMS Division
6011 Executive Blvd.
Rockville, MD.
20852 U.S.A.

BRS - Bibliographic Retrieval Services

The BRS search system combines sophisticated & flexible searching techniques - is structured so that a user can sign on to the system, enter a complicated search strategy, retrieve results and sign off with a minimum of interaction. The results of a search may be printed offline at the BRS Computer Center.

Other features of BRS are:
1) the root feature
2) truncation feature
3) free-text positional searching
4) field qualification feature
5) cross data search capability (BRS/CROSS)
6) BRS/MERGE capability
7) save search feature
8) automated SDI feature with online editing capability

1200 Route 7
Latham, New York 12110
(518) 783-1161

CAN/OLE (Canadian Online Enquiry)

CAN/OLE was created in 1973 jointly by the Canadian Institute for Scientific & Technical Information (CISTI) and the National Research Council Computation Center. It is an online information retrieval system currently being used by more than 60 institutions in Canada to access over three-million citations culled from the world's scientific and technical literature.

OLE is a means whereby anyone is Canada with a telephone and a a computer terminal can pose questions to a database containing leads to several million answers. The computer in Ottawa is given instructions through a set of ten basic commands, allowing a person to engage in dialogue with the machine and within minutes, possibilites are narrowed down to a small highly relevant set of citations.

The main problems with the system can be grouped into three

broad categories: cost, complexity and impact.

Contact: James Heilik
Cisti Systems Design & Development Section
Ottawa, Ontario

DIALOG PRIVATE FILE SERVICE

- offers public access to over 130 databases.
- online indexes are created online, (the record is indexed by every word automatically).

There are some drawbacks to the system:

1) files have to be in machine-readable form-properly formatted or the conversion is expensive.

2) the file can only be updated online by Dialentry and text editing is possible only at entry stage. It is not possible to add new information to alter the data.

in CANADA contact:
Ms Ulla de Stricker
Micromedia Ltd.
144 Fort St. W.
Toronto, Ontario
M5J 2L7
(416) 593-5211

EASY DATA SYSTEMS LTD.

has developed library catalogue software designed to run on Datapoint minicomputers. The finshed products can either be microfiche or a computer-printed book catalogue.

401-1200 Lonsdale
North Vancouver
British Columbia
(604) 986-8261

FACTMATCHER

Factmatcher's information retrieval technique is also suited to bibliographic data. It combines fixed field format statements with an automatic prefixing technique. Searches can be either for specific fields or free text or a combination.

Mini-Computer systems, Inc.
399 Fairview Park Drive
Elmsford, N.Y. 10523

FORMAT

This system assists the Canadian film industry and community in

the selection, acquisition and utilization of Canadian non-print media. It is bilingual and input is handled according to the format specifications of machine-readable cataloguing designed by the National Library of Canada.

FRECIS (Preserved Context Index System) is used to provide subject access to the film file.

The film records are stored in CAN/MARC format according to the latest specifications of the National Library.

The information in the system is available through 2 output modes:

1) offline (microfiche and print catalogue)
2) online

IBIS (Inforonics' Bibliographic Information Services)

is a bibliographic system that is flexible, allowing for many levels of cataloguing detail, online access for input and retrieval. It also can provide printouts for several different fields.

Inforonics Ltd.
550 Newtown Rd.
Littletown, MA. 01460

INMAGIC

is a library management company which allows for storage, organization, and retrieval of information about company reports, client and personnel files, catalogues, and library collections. Users can search, update and change data online as well as receive print formats such as labels and reports. The program is written in Fortran IV for Hewlett Packard, Digital Equipment Corporation and IBM equipment.

Madeline Miele
Director of Sales & Marketing
Warner-Eddison Assoc., Inc.
186 Alewife Brook Parkway
Cambridge, Mass. 02138

MABRA

is a private file that can manage a collection of any type of document or item. The number of fields is unlimited, but fields can be no longer than the line length. A file can be entered online and searched immediately, or batched for next day searching.

I.P. Sharp Assoc.
902-700 West Pender St.

Vancouver, B.C.
V6C 1G8
(604) 687-8991

MINISIS

is a database management system oriented towards bibliographic information. It combines the functions of both an acquistions and a cataloguing system into one database. Possible online functions include data entry, modification of records, sorting records into various orders for indexes (KWIC, KWOC, alphabetical author etc.) printing of specific records, and retrieving records.

Systemhouse
900 West Hastings St.
Vancouver, B.C.

QL PRIVATE FILE SERVICE

Input data for the QL Retrieval System does not have to conform to any pre-defined format. Storage printing and set up costs are probably the lowest of any of the other systems mentioned but search costs can be expensive, retrieval is cumbersome and less flexible.

QL Systems Ltd.
1018 Tower B,
Place de Ville
112 Kent St.
Ottawa, Ontario
K1P 5P2
(613) 238-3499

RESEARCH & RETRIEVAL SYSTEM

is designed to classify and retrieve documents, internal research, the contents of a library and legal precedents. It was designed for law firm libraries and does not have a great number of fields.

Manac Systems International Ltd.
1730 Place Ville Marie
Montreal, Quebec
H3B 2C1

SPIRES (Stanford Public Information Retrieval System)

Originally developed for Stanford University Library automation system, SPIRES has been used by many other organizations for rather diverse applications.

It has the facility for online indexing and entry. It is good for building private files, as it can handle both bibliographic data as well as numeric and structured data. The user sets up his own file definition. The Universities of Alberta, Waterloo and B.C. have acquired SPIRES software for their computer centres. Many Canadian educational institutions use it through the UBC and U of A's computers, in lieu of mounting it in-house.

SPIRES contact person
G.A. (Nita) Cooke
Boreal Institute Library
CW 401 BioScience Building
University of Alberta
Edmonton, Alberta
T6G 2E9

STAIRS - Storage & Information Retrieval Systems is an IBM software package. It is a multiple-user system that allows:

- interactive creation and storage of databases of documents.
- expansion of existing databases.
- retrieval of data from databases according to specified criteria through an interactive dialogue with the system.
- retrieved data to be displayed at a terminal and/or printed on a high-speed printer.

The STAIRS system was adapted for use as an online card catalogue in a corporate library system. One of the major disadvantages is the inability to make corrections to a database entry quickly and easily.

IBM Canada Ltd.
701 West Georgia St.
P.O. Box 10132
Vancouver, B.C.
V7Y 1G1
(604) 665-8200

APPENDIX VIII

EVALUATION OF EDUCATIONAL SOFTWARE

INTRODUCTION

This appendix includes examples of evaluation formats used by organizations involved in educational software collection, evaluation or dissemination.

The appendix has two catagories:

A) Examples of Evaluation Forms and Methods

B) Articles on Evaluation of Educational Software.

A) EXAMPLES OF EVALUATION FORMS AND METHODS

	NAMES	ADDRESSES
1.	Creative Educational Services	386 St. Clements Ave. Toronto, Ontario M5N 1M1 (416) 488-9905
2.	ECOO (Educational Computing Organization of Ontario)	ECOO Newsletter June/81 2(2) p.35
3.	E.P.I.E. Institute (Educational Products Information Exchange)	EPIE P.O. Box 620 Stony Brook, NY 11796 (516) 246-8664
4.	Guidelines for Evaluating Computerized Instructional Materials Heck, William P. Johnson, Jerry Kansky, Robert J.	Instructional Affairs Committee National Council of Teachers of Mathematics
5.	JEM Research Joint Educational Management Research	Discovery Park University of Victoria P.O. Box 1700 Victoria, B.C. V8W 2Y2
6.	MicroSIFT Computer Technology Program	Northwest Regional Educational Laboratory 300 S.W. Sixth Ave. Portland, Oregon
7.	Non-print Materials Evaluation	P.E.I. Department of Education
8.	Nova Math A Journal for Teachers of Mathematics Vol. 1 No. 1	c/o Department of Mathematics Statistics & Computing Science Dalhousie University Halifax, N.S. B3H 4H8
9.	School MicroWare Evaluation Form	A Directory of Educational Software P.O. Box 246 Dresdon, Maine 04342

1. Creative Educational Services

Description: This evaluation form was developed by Gordon S. Wells at Creative Educational Services with the intention that it would be used as an initial assessment instrument that a single sheet of information would be derived from the data gathered.

These evaluation forms are accompanied with a complete guide to provide the evaluator with an outline of exactly what is expected in terms of evaluator responses for each of the criteria.

LESSONWARE EVALUATION FORM Date _____

CATALOGUE

PROGRAM NAME: _____ VERSION: _____

AUTHOR: _____

PUBLISHER: _____

ADDRESS: _____

CITY: _____ SUBJECT AREA: _____

COST: _____ TOPIC: _____

GRADE LEVEL (circle): K 1 2 3 4 5 6 7 8 9 10 11 12 13 N/A

INTENDED USER:

☐ TEACHER ☐ STUDENT ☐ PROGRAMMER ☐ OTHER (specify) _____

SYSTEMS REQUIREMENTS

COMPUTER

☐ APPLE ☐ ATARI ☐ CBM ☐ COMMODORE ☐ RADIO SHACK ☐ OTHER (Specify) _____

Model: _____

Required memory: ☐ 8K ☐ 16K ☐ 32K ☐ 48K ☐ 64K

PERIPHERALS REQUIRED

☐ Disk Drive ☐ 2 Disk Drives ☐ Cassette Player ☐ Paddles

☐ B/W Monitor ☐ Colour Monitior ☐ Light Pen ☐ TV Receiver

☐ Printer (specify model) _____

☐ Card Reader (specify model) _____

☐ Plotter (specify model) _____

☐ Other (specify) _____

SOFTWARE REQUIRED

☐ Language (specify version) _____

☐ DOS (specify version) _____

☐ Other (specify) _____

DRAFT VERSION 1.0

OBJECTIVES

1. List the instructional objectives which are provided by the publisher.

2. Does this program respond to each of the instructional objectives identified by the publisher? ☐YES ☐NO

   If 'no' explain _____

CURRICULUM

1. Identify the guideline(s) or related Ministry of Education document(s) to which this program is related.

2. To what course or program in each of the above guidelines does the lessonware apply?

3. What specific topics are dealt with in this program?

CONTENT

1. Are there examples of inaccurate subject content? ☐YES ☐NO

   (Give all examples) _____

   _____

   _____

2. Were any errors found in:

   a. punctuation ..... ☐YES ☐NO
   b. grammar ..... ☐YES ☐NO
   c. spelling ..... ☐YES ☐NO
   e. capitalization ..... ☐YES ☐NO

   Specify errors _____

   _____

   _____

3. Is the program free from:

   a. racism ..... ☐YES ☐NO
   b. sexism ..... ☐YES ☐NO
   c. stereotypes ..... ☐YES ☐NO
   d. negative feedback ..... ☐YES ☐NO

   Specify _____

   _____

   _____

TEACHER OPTIONS

1. Does the program allow the teacher to:

   a. enter or select alternate feedback to students ☐YES ☐NO
   b. eliminate certain segments of the content ..... ☐YES ☐NO
   c. add new materials to the program ..... ☐YES ☐NO
   d. impose or alter time limit on student ..... ☐YES ☐NO
   e. record or not record scores ..... ☐YES ☐NO
   f. disable sound, if applicable ..... ☐YES ☐NO

INSTRUCTIONS

1. Do the instructions appear to be comprehensive and clear enough for students to use? ☐YES ☐NO

2. Will an orientation beyond that which is provided in the program and documentation be required by:

   a. the teacher ..... ☐YES ☐NO
   b. the student ..... ☐YES ☐NO

PROGRAM MODE

Drill and Practice	Test Construction or Analysis
Instructional Game	Tutorial
Instructional Management	Programming Utility
Instructional Support	Information
Problem Solving	Research
Simulation	Communications

Other (specify) _____

PEDAGOGICAL FACTORS

1. Is more than one level of difficultv provided? ☐YES ☐NO
2. Is there a diagnostic or placement test in the program? ☐YES ☐NO
3. What is the anticipated time required by a pupil to complete the program? _____
4. Do you consider this method of presentation to be sound educationally? ☐YES ☐NO
5. Is this application better suited to another method of instruction? ☐YES ☐NO

   Explain _____
   _____
   _____

6. Is the grade level(s) indicated on page one appropriate for the user? (Indicate appropriate grade level on page one if this has not been done.) ☐YES ☐NO

   Explain _____
   _____
   _____

1. I would use or recommend use of this package with little or no change. ☐ YES ☐ NO

2. I would use or recommend use of this package only if certain changes were made. ☐ YES ☐ NO

3. I would not use or recommend this package. ☐ YES ☐ NO

4. Describe the potential use of the package in classroom settings.

5. Describe major strengths of the package.

6. Describe major weaknesses of the package.

2. ECOO

Description: This form is used to record observations on microcomputer based educational software. Instructions for completing the form are included in it.

Reviewer's name(s)_____

Reprinted in the ECOO Newsletter 2(2). June, 1981. Page 35.

_____

Software Evaluation Form - 1517

81.01.28

Suggested use: Use this form for recording your observations on microcomputer-based educational software. Record the factual material, then make at least two runs through the material: the first to get the general feel of the material, then succeeding runs looking for particular features and problems. Record observations about particularly good, as well as bad, features. If you need more room, continue on plain paper, noting item number.

1. Program name: _____

2. Source of program: _____

3. Version
(or other identifying information): _____

4. Content field: _____

_____

5 a) School population
(for whom suitable)_____ b) Other population
(for whom suitable) _____

6. Computer required: Circle: APPLE COMPUCOLOR PET TRS-80

Other (specify) _____

b) Memory size required: _____ Peripherals required: _____

d) Optional peripherals _____

7. What features are required? Circle: Graphics Text Colour
Sound Output Speech Output

Other (specify)_____

8. Summarize program in 100 words or less.

9. Indicate strategy used (circle all that apply):

Tutorial
Simulation
Game
Drill and practice
Problem solving

Explain:
Tool for the teacher _____
Tool for the student _____
Other _____

10. Cite particularly good or particularly bad aspects of the program with regard to the following areas of concern:

a) Objectives: Does program indicate what it is designed to do?

b) Instructions: Is it clear what the user is to do?

c) Output to the user: Is display used effectively?

d) Input: Does program resist user errors and recover gracefully?

e) Execution: Is program correct in content and performance?

f) Richness: Is task adequately rich for intended audience?

g) Length: What time is the typical user likely to spend with this program?

h) Is the task appropriate for a computer?

i) What could be done to improve the program?

11. Summarize your evaluation in less than 100 words.

3. E.P.I.E. Institute
Educational Products Information Exchange

Description: In 1980, the E.P.I.E. Institute and the Microcomputer Resource Center began a joint project to analyze and evaluate instructional software for the microcomputer. The complete guide for evaluating is called "Defining Effective Microcomputer Courseware". This provides the teacher with complete instructional materials analysis: a description of the developer's rationale, learning objectives, content, methods, activities and the evaluation and management system built into the software. In addition it looks at specific instructional strategies which should be employed to facilitate instruction. The following analyst form is only a sample of one of the first of many courseware analyses and evaluations from E.P.I.E.

Analyst Name_____ Date_____ 19____

I. IDENTIFICATION AND BACKGROUND

A. Bibliographic Information

1. Title:_____
2. Authors:_____
3. Manufacturer or Publisher:_____
4. Address:_____
5. Copyright Date(s) (if no date, specify):_____
6. Cost:_____
7. Available for what microcomputer(s) (model and memory):_____

_____

B. Components

A Teacher's Guide for the whole program ____ is included

____ is not included

Grade Level	Title	Cassette	Disk	Module	Separate Tchr's Guide
_____	_____	____	____	____	____
_____	_____	____	____	____	____
_____	_____	____	____	____	____
_____	_____	____	____	____	____
_____	_____	____	____	____	____
_____	_____	____	____	____	____
_____	_____	____	____	____	____
_____	_____	____	____	____	____
_____	_____	____	____	____	____
_____	_____	____	____	____	____
_____	_____	____	____	____	____
_____	_____	____	____	____	____
_____	_____	____	____	____	____
_____	_____	____	____	____	____
_____	_____	____	____	____	____

*Indicates not available for analysis

Copyright © 1981 by EPIE Institute

Developed by Vicki L. Blum

C. Supporting Materials

Give title, type of medium (print, video, audio cassette, film, etc.), producer/source, and role they play in the program.

Title	Medium	Producer	Role in program (e.g., required or supplementary

D. Program Application

1. Subject Area(s): _____

2. Curriculum Role:
   - ____ Supplementary/Adjunct
   - ____ Basic Course/Mainline
   - ____ Management Only
   - ____ Other _____

3. Mode of interaction (check as many as apply):
   - ____ Drill and practice
   - ____ Tutorial
   - ____ Gaming
   - ____ Simulation
   - ____ Problem Solving
   - ____ Exploration

E. Program Users

1. Intended Users: _____
   - ____ Specified in materials
   - ____ Specified in Teacher's Guide
   - ____ Inferred

2. Learner Entry Competencies: _____
   - ____ No special competencies required
   - ____ Competencies required but not specified
   - ____ Special competencies specified in: _____
     _____

II. INTENTS

A. Developer's Rationale

1. ____ Specified by developer ____ Inferred by analyst
2. Source: _____

Rationale: _____ (Check as many as apply):

_____
_____ ____ Develop skills in particular area
_____ ____ Present concepts and principles
_____ ____ Supplement other resources
_____ ____ Apply specific instructional approach
_____ ____ Serve special group of learners
_____ ____ Introduce subject matter content in
_____ a unique or specific way.
_____ ____ Other: _____

B. Learner Objectives

1. ___ Specified by developer ____ Inferred by analyst

Source: _____

2. Example of Objectives: _____ Major emphasis of objectives are:
_____ (Check as many as apply):

_____
_____ ____ Recall of previously learned facts
_____ ____ Application of specific skill(s)
_____ ____ Abstraction beyond concrete level
_____ ____ Transfer of learning (i.e., to
_____ real life situations)
_____ ____ Critical thinking skills
_____ ____ Create specific feelings and
_____ attitudes
_____ ____ Develop study skills
_____ ____ Other: _____

C. Instructional Strategies

	Always Present	Sometimes Present	Never Present
1. Objectives are stated behaviorally. Comments: _____	____	____	____
2. Objectives are stated in terms of the learner. Comments: _____	____	____	____
3. Objectives include higher order skills such as comprehension, application, analysis, synthesis, and evaluation. Comments: _____	____	____	____
4. Learners are informed of the objectives. Comments: _____	____	____	____

A. Content Scope

1. Topics Covered (list main topic(s), theme(s), units covered):

_____

_____

	Yes	No
2. Range of content material is adequate to achieve program's intents.	____	____
3. Scope is appropriate for learning levels of intended users.	____	____

B. Content Sequence

1. ____ Specified by developer ____ Inferred by analyst

2. Source: ____ Documentation ____ Teacher's Manual

____ Catalogue ____ Other:_____

If specified, briefly describe sequence of content:_____

_____

_____

3. Total program sequence: (Check as many as apply)

Comments:_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

____ Chronological

____ Unit (natural unit in subject matter)

____ Problem-centered

____ Descriptive

____ Task Analysis (breaking task into parts and teaching progressively harder steps)

____ Dictated by learning approach (i.e., simulation, game)

____ Other_____

4. Student sequence through the total program:

Comments:_____

_____

_____

	Yes	No
Is set by program	___	___
Is set by teacher	___	___
Is left to user	___	___

5. Students' entry into and out of an activity:

Comments:_____

_____

_____

_____

_____

_____

_____

	Yes	No
Is fixed by program in set sequence and user must continue through whole sequence	___	___
Can be varied by user	___	___
Can be varied by teacher	___	___

C. Preinstructional Strategies

	Always Present	Sometimes Present	Never Present
1. Pretests are used.			
Comments: _____	___	___	___
_____			
2. Advanced organizers such as pre-questions, overviews, and summaries are used.			
Comments: _____	___	___	___
_____			
3. Clear and concise title is presented at the beginning of each unit in the program.			
Comments: _____	___	___	___
_____			

D. Instructional Strategies

Instructional Text Format:			
1. Information is formatted for easy reading.			
Comments: _____	___	___	___
_____			
2. Labels or headings identify different kinds of information.			
Comments: _____	___	___	___
_____			
3. Sentence structure is easily understood for user population (i.e., sentences aren't too long or too short).			
Comments: _____	___	___	___
_____			
Concept Learning:			
4. The program uses a number of examples to teach each concept.			
Comments: _____	___	___	___
_____			

	Always Present	Sometimes Present	Never Present
Concept Learning:			
5. The program uses a number of nonexamples to teach each concept.			
Comments:_____	___	___	___
_____			
6. Practice in varied contexts is provided.			
Comments:_____	___	___	___
_____			
Enhancing Retention:			
7. Vocabulary is appropriate for the user.			
Comments:_____	___	___	___
_____			
8. When used, graphics are:			
a. embedded in the instuctional content (i.e., are an essential part of instruction)	___	___	___
b. used for enhancement only (i.e., are not part of the content but used to enhance presentation or feedback)	___	___	___
9. Graphics are used appropriately:			
a. are relevant for user's age and level	___	___	___
b. are not distracting	___	___	___
c. support program's intents	___	___	___
10. Cues and/or prompts are used after wrong response.			
Comments:_____	___	___	___
_____			
11. Action occurs on the screen (i.e., there is graphic movement other than just words; specify if used in content, feedback only, or both).			
Comments:_____	___	___	___
_____			
13. A demonstration of the exercise is given.			
Comments:_____	___	___	___
_____			

IV. METHODOLOGY

A. Presentation

1. Methods for using the materials are:

   _____ Specified by developer _____ Left to user _____ Left to Teacher

2. Source: _____ Teacher's Guide or instructional suggestions

   _____ Directions in program _____ Other: _____

B. Instructional Approach

1. Briefly describe the instructional approach used in organizing the activities of this program (i.e., what does a teacher and student have to do to progress through a unit?). _____

C. Teacher Use

1. Teacher Training:

   Comments: _____

   _____ Is specified

   _____ Is not mentioned

2. Teacher Use/Guidance:

   Comments: _____

   _____ Inservice Training

   _____ Lesson plans in Teacher Guide

   _____ General suggestions in Teacher's Guide

   _____ No guidance provided

D. Teacher's Manual

1. _____ Is provided _____ Is not provided

	Yes	No
2. Content provides:		
Enough information to familiarize teacher with technical use of program	___	___
Classroom strategies for use of program	___	___
Instructional activities to integrate program into curriculum	___	___
3. Instructions:		
Are well organized	___	___
Are clearly stated	___	___
Provide step-by-step approach	___	___

Comments: _____

E. Instructional Strategies

	Always Present	Sometimes Present	Never Present
1. Instructions in the program for the student are easily understood.	___	___	___
2. Instructions in the program for the student are concise.	___	___	___
3. Please consider the extent to which the user can control the rate and sequence of presentation over:			
a. amount of time allowed for solving the problem (i.e., can user choose how many seconds each problem is presented)	___	___	___
b. rate that display material is presented so user can read information at own pace	___	___	___
c. choice of sequence so user is not confined to linear path	___	___	___
d. where entry into program must begin	___	___	___
e. exiting an activity at any time	___	___	___
f. reviewing instructions	___	___	___
g. options available in sequence such as "HELP," "HINT," "ESCAPE" keys	___	___	___

Comments: _____

4. Guidelines for Evaluating Computerized Instructional Materials
Heck, William P.
Johson, Jerry
Kansky, Robert J.

Description: This software evaluation checklist was extracted from a larger report titled `Guidelines for Evaluating Computerized Instructional Materials'.

Other topics discussed in the report were:
a. Obtaining software and documentation
b. Guidelines for software review
c. Guidlelines for software documentation.

SOFTWARE EVALUATION CHECKLIST

PROGRAM NAME: _____ SOURCE: _____ COST: _____

SUBJECT AREA: _____ REVIEWER'S NAME: _____ DATE: _____

1. INSTRUCTIONAL RANGE

_____ grade level(s)

_____ ability level(s)

2. INSTRUCTIONAL GROUPING FOR PROGRAM USE

_____ individual

_____ small group (size: _____)

_____ large group (size: _____)

3. EXECUTION TIME

_____ minutes (estimated) for average use

4. PROGRAM USE(S)

_____ drill or practice

_____ tutorial

_____ simulation

_____ instructional gaming

_____ problem solving

_____ informational

_____ other (_____)

5. USER ORIENTATION: INSTRUCTOR'S POINT OF VIEW

low				*high*	
•	•	•	•	•	flexibility
•	•	•	•	•	freedom from need to intervene or assist

6. USER ORIENTATION: STUDENT'S POINT OF VIEW

low				*high*	
•	•	•	•	•	quality of directions (clarity)
•	•	•	•	•	quality of output (content and tone)
•	•	•	•	•	quality of screen formatting
•	•	•	•	•	freedom from need for external information
•	•	•	•	•	freedom from disruption by system errors
•	•	•	•	•	simplicity of user input

7. CONTENT

low				*high*	
•	•	•	•	•	instructional focus
•	•	•	•	•	instructional significance
•	•	•	•	•	soundness or validity
•	•	•	•	•	compatibility with other materials used

8. MOTIVATION AND INSTRUCTIONAL STYLE

passive				*active*	
•	•	•	•	•	type of student involvement

low				*high*	
•	•	•	•	•	degree of student control

none	*poor*				*good*	
•	•	•	•	•	•	use of game format
•	•	•	•	•	•	use of still graphics
•	•	•	•	•	•	use of animation
•	•	•	•	•	•	use of color
•	•	•	•	•	•	use of voice input and output
•	•	•	•	•	•	use of nonvoice audio
•	•	•	•	•	•	use of light pen
•	•	•	•	•	•	use of ancillary materials
•	•	•	•	•	•	use of _____

9. SOCIAL CHARACTERISTICS

present and negative	*not present*	*present and positive*	
_____	_____	_____	competition
_____	_____	_____	cooperation
_____	_____	_____	humanizing of computer
_____	_____	_____	moral issues or value judgments
_____	_____	_____	summary of student performance

SAMPLE SOFTWARE DOCUMENTATION SHEET

PROGRAM NAME: _____

SUBJECT AREA: _____

PROGRAM CLASS

____ isolated program

____ part of a ____ program cluster

INTENDED AUDIENCE(S)

____ teachers

____ students in grade(s) _____

____ other _____

_____

PROGRAM USES: (1 = primary, 2 = secondary)

____ drill or practice

____ tutorial

____ simulation

____ instructional gaming

____ problem solving

____ informational

____ other _____

_____

CRITICAL PREREQUISITE SKILLS

_____

_____

NAME(S) OF PREREQUISITE PROGRAM(S)

_____

_____

_____

NAME(S) OF FOLLOW-UP PROGRAM(S)

_____

_____

_____

DATE OF THIS DOCUMENTATION

_____

PROGRAM SOURCE

name: _____

address: _____

_____

_____

phone: _____

program cost: _____

SYSTEM REQUIREMENTS

computer: _____

language: _____

memory needed: _____ bytes

input mode: cassette

____-inch diskette

cartridge

other _____

_____

output mode: color monitor

B/W monitor

printer

plotter

other _____

_____

CLASSROOM VALIDATION (describe)

_____

_____

_____

TIME FOR AVERAGE EXECUTION ____ minutes

OVER

GENERAL DESCRIPTION OF THE PROGRAM (i.e., purpose of the program)

SPECIAL PROGRAM CHARACTERISTICS (e.g., use of graphics or sound, designed for use by groups of two or more persons at a time, level of difficulty can be modified by teacher (only) or student, exit from program is controlled by the teacher (only) or student, etc.)

DIRECTIONS FOR USE OF THE PROGRAM (e.g., directions not presented in the program itself but needed for program execution, directions regarding the use of the program within the total instructional process, notes regarding program options, etc.)

ANCILLARY MATERIALS REQUIRED (e.g., books, worksheets, charts, data lists, dice, geometric shapes, lab equipment, etc.)

ADDITIONAL DOCUMENTATION AVAILABLE (check box for each type)

- ☐ sample run (location _____)
- ☐ program listing (location _____)

5. JEM Research - Joint Educational Management Research

Description: The following three forms for evaluation of educational software were prepared by JEM Research in cooperation with the Ministry of Education British Columbia.

The first form is a summary of the evaluation format used for analysis of microcomputer-based instructional packages.

Form two is a courseware evaluation checklist which provides a quick and easy method for teachers to record important information about a program and to comment on the quality and features of a program.

The third form, `Student's Program Evaluation Form' is included for teachers to have a means of recording and assessing student's reactions to particular programs and to microcomputers in general.

I. JEM EVALUATION

Analysis of Microcomputer-based Instructioal Packages.

A. Identification

This will include such information as title, developer, publicati date, components, peripherals needed, language, cost, subject area user level, etc.

B. Purpose/Intent.

List the purposes (rationale for development) goals, objectives ( ) that the package is intended to achieve. (Identify instructional prerequisites.) (Note: if it is inferred say so.)

C. Content.

List the topics and/or skills covered. Include information suppli by supplementary components.

Describe the user control over sequencing, rate, amount, type and content of problem examples.

D. Structure.

Describe the instructional strategy used in the courseware. What is the role of the user? Is the package basic instructional materi or supplementary? Describe the flow or sequence of activity. How is feedback provided ? How much feedback is provided ?

E. Documentation.

Describe the nature of and level of specificity provided by the documentation.

F. Technical considerations.

Comment on suchaspects as clarity, visual appeal, use of graphics ease of use, level of instructions/directions , special features et

G. Readability/language level

Fog formula to be used or 'teacher judgement'. Include comments on level of concepts and idea load.

H. General Comment.

Identify strengths and weakness of program package. Comment on t degree to which the program achieves its goals. Comment on the ove 'elegance of the program.

I. Curriculum Match.

Comment on the degree of correlation with the B.C. Computer Science Course as well as the appropriateness for use with sen secondary school students.

II.

COURSEWARE EVALUATION CHECKLIST

Name of Program: _____
Name of Diskette: _____
Type of Program: _____
Subject Area: _____
Grade Level: _____
Peripheral: _____
Memory: _____
Source: _____

	yes	no	not relevant
1. The subject matter of this package is central to the field.			
2. The content is consistent with the goals and objectives of the established curriculum.			
3. Where appropriate, as in drill and practice, individualized instruction, remediation, or enrichment activities, there are diagnostic procedures built in.			
4. Evaluative procedures.			
5. Review procedures.			
6. A classroom management system.			
7. The program is one of a series in which a carefully planned sequence of learning objectives has been followed.			
8. The microcomputer is the best available method for presenting these materials.			

	yes	no	not relevant
9. The material is clearly and attractively packaged.			
10. Students enjoy using the program.			
11. The program will run right through without becoming "hung-up" because of unexpected response.			
12. The "escape" directions are repeated at timely intervals throughout the program.			
13. When the student is confused, help can be obtained.			
14. The student is not trapped in a situation where a repeated incorrect response results in the same question being repeated over and over again.			
15. Depending on the complexity or purpose of the program, the branching capabilities of the microcomputer are used when a student obviously shows that some tutoring or further information is required before proceeding.			
16. Feedback as to whether the student's response is correct or incorrect, is immediate.			
17. Positive reinforcement and encouragement are given intermittently.			

	yes	no	not relevant
18. Reinforcement is positive, appropriate, dignified and not time consuming.			
19. Directions are accompanied by useful examples where appropriate.			
20. The student can choose to see the directions again.			
21. Sound is used only when it is essential.			
22. Colour, graphics, and animation are used only when they enhance the lesson.			
23. Advantage is taken of the interactive capabilities of the microcomputer.			
24. Protocols of communication from the user to the computer are logical and unvarying.			
25. The student is never left with a blank screen and no indication of what is happening.			
26. The program ends with some suitable directions for the student.			
27. The program operates at the rate of the person sitting at the keyboard.			

	yes	no	not relevant
28. The material is appropriate for the target grade level in terms of prerequisite basic skills.			
29. Documentation is available.			
30. The text obeys the strictest rules for punctuation, capitalization, grammar, spelling and usage.			
31. Words and lines are spaced for ease of reading.			
32. The use of space on the entire screen in effective.			
33. Variation in type and organization of textual materials are appropriate for a clear presentation.			

Description and Comments:

III. Student's Program Evaluation Form

1. What is your name? _____

2. How old are you? _____

3. What grade are you in? _____

4. In what subject area were you using the program?

_____

5. What was the name of the program?

_____

6. Were the directions easy to follow?_____

7. Were there any words you could not read?_____

8. Were there any words you did not understand?_____

9. Were there any mathematics problems you thought were too difficult for your grade level? _____

10. Would you rather have done this lesson in some way other than by using the microcomputer? _____

_____

11. Did you enjoy the program?_____

12. Do you feel that you learned from it? _____

13. What did you dislike about the program?_____

6. MicroSIFT - Computer Technology Program

Description: This evaluation form was extracted from the evaluator's guide which was developed to provide background information and forms to aid teachers and other educators in evaluating educational software and courseware. The MicroSIFT guide is lengthy, (44 pages) and gives detailed descriptions for complete evaluation of courseware.

Excerpt from Evaluator's Guide developed by MicroSIFT, a project of Computer Technology Program, NWREL, 300 S.W. Sixth Avenue, Portland, Oregon 97204.

Northwest Regional Educational Laboratory

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RATING: Circle the letter abbreviation which best reflects you judgment (use the space following each item for comments).

IMPORTANCE: Circle the letter which reflects you judgment of the relative importance of the item in this evaluation.

☐ Check this box if this evaluation is based partly on your observation of student use of this package.

	RATING (Strongly Agree / Agree / Disagree / Strongly Disagree / Not Applicable)	IMPORTANCE (OPT) (Higher / Lower)	
CONTENT	SA A D SD NA	H L	1. The content is accurate.
	SA A D SD NA	H L	2. The content has educational value.
	SA A D SD NA	H L	3. The content is free of race, ethnic, sex, and other stereotypes.
INSTRUCTIONAL QUALITY	SA A D SD NA	H L	4. The purpose of the package is well-defined.
	SA A D SD NA	H L	5. The package achieves its defined purpose.
	SA A D SD NA	H L	6. Presentation of content if clear and logical.
	SA A D SD NA	H L	7. The level of difficulty is appropriate for the target audience.
	SA A D SD NA	H L	8. Graphics/color/sound are used for appropriate instructional reasons.
	SA A D SD NA	H L	9. Use of the package is motivational.
	SA A D SD NA	H L	10. The package effectively stimulates student creativity.
	SA A D SD NA	H L	11. Feedback on student responses is effectively employed.
	SA A S SD NA	H L	12. The learner controls the rate and sequence of presentation and review.
	SA A D SD NA	H L	13. Instruction is integrated with previous student experience.
	SA A D SD NA	H L	14. Learning is generalizable to an appropriate range of situations.
TECHNICAL QUALITY	SA A D SD NA	H L	15. The user support materials are comprehensive.
	SA A D SD NA	H L	16. The user support materials are effective.
	SA A D SD NA	H L	17. Information displays are effective.
	SA A D SD NA	H L	18. Intended users can easily and independently operate the program.
	SA A D SD NA	H L	19. Teachers can easily employ the package.
	SA A D SD NA	H L	20. The program appropriately uses relevant computer capabilities.
	SA A D SD NA	H L	21. The program is reliable in normal use.

22. CHECK ONE ONLY
- ____ I would use or recommend use of this package with little or no change.
- ____ I would use of recommend use of this package only if certain changes were made.
- ____ I would not use or recommend this package.

This work was devloped under contract #400-80-0105 with the National Institute of Education, U S Department of Education. However, the content does not necessarily reflect the position on policy of that agency, and no official endorcement of these materials should be inferred.

7. Non-print Materials Evaluation

Description: This evaluation form was developed by the Department of Education in P.E.I. for non-print materials.

P.E.I. DEPARTMENT OF EDUCATION

TITLE: _____ COST: _____

PRODUCER: _____ YEAR: _____

CURRICULUM AREA(S): _____ ☐ *stated* ☐ *implied* ☐ *left to user*

GRADE(S): _____ ☐ *stated* ☐ *implied* ☐ *left to user*

TYPE OF MATERIALS: ☐ *16mm film* ☐ *filmstrip* ☐ *slides* ☐ *video tape* ☐ *overheads* ☐ *photo prints* ☐ *records* ☐ *audio tapes*

TIME _____ ☐ *other* _____

OBJECTIVE: (Educational purpose) ☐ *stated* ☐ *implied* ☐ *left to user*

CONTENT SUMMARY: (Describe materials, production style & treatment.)

☐ *photographs*
☐ *drawings*
☐ *diagrams/graphs*
☐ *animation*
☐ *live action*
☐ *cartoons*
☐ *special effects*

	EXCELLENT	*GOOD*	*POOR*
APPROPRIATENESS: (Relation to subject, objectives and mode)	☐	☐	☐
SOPHISTICATION: (Suitable for age, previous experience, intelligence)	☐	☐	☐
CONTENT: (Accurate; impartial; up-to-date; balanced)	☐	☐	☐
ORGANIZATION: (Logical; clear; orderly treatment of subject)	☐	☐	☐
INTEREST LEVEL: (Stimulation; imagination; sensory appeal)	☐	☐	☐
TECHNICAL QUALITY: (Picture; sound; clarity; technique)	☐	☐	☐
SPECIAL FEATURES: (Notes; guides; accompanying material)	☐	☐	☐

(OVER)

DESCRIBE POSSIBLE USES: ☐ *stated* ☐ *implied* ☐ *left to user*

(Check off all potential uses.)

- ☐ *introduce/overview*
- ☐ *present information*
- ☐ *build motivation/interest*
- ☐ *aid concept formation*
- ☐ *aid problem solving*
- ☐ *provide skills/drill*
- ☐ *review/culminating activity*
- ☐ *appreciation*
- ☐ *values clarification*
- ☐ *other*_____

Comments:

OVERALL CRITIQUE: (Strong & weak points, special features, etc. If necessary, explain content ratings from previous page.)

OVERALL RATING: ☐ *excellent* ☐ *good* ☐ *poor*

PURCHASE RECOMMENDATION: ☐ *yes* ☐ *no*

EVALUATOR:_____ DATE:_____

8. Nova Math - A Journal for teachers of mathematics

Description: This computer package evaluation guide was taken from the Journal, Nova Math. The journal's expected audience is primarily the teachers of mathematics at the high school level. One topic they emphasize is the understanding and use of microcomputers in the classroom with a hope that Nova math will be able to serve as a central clearinghouse for information on microcomputers. Nova Math included this evaluation guide as an aid for teachers interested in computer software for the classroom.

NOVA MATH

COMPUTER PACKAGE EVALUATION GUIDELINES

I DO/ DO NOT recommend this package.

Reviewer's Name_____

Address_____

_____

Date_____

Please fill out as much of this form as you feel is appropriate.
(Attach additional sheets if necessary)

A. GENERAL INFORMATION

Package Name_____

Supplier:Name_____

Address_____

_____

Subject area_____Grade_____

Machine requirements: Model_____

Memory size_____

Language used_____

Estimated execution time_____

Package use(s):____drill and practice,____problem solving

____game,____simulation,____tutorial,

____remediation,____enrichment,____management,

____diagnostic,____other

Instructional Grouping:____individual,_____small group(size)

____large group(size)

B. SYNOPSIS: Briefly describe how you as a teacher use this package in your classroom and whether the students benefit.

C. STUDENT-PROGRAM INTERFACE

1. Program provides for different degrees of difficulty. Yes No
2. Student user controls level of difficulty. Yes No
3. Program can respond to wrong typing entries. Yes No
4. User performance is reported to: user Yes No
   teacher Yes No
5. How many wrong answers does the program allow?_____

	very good	good	average	poor	disastrous	not applicable
6. Program responds appropriately if user needs help.						
7. Screen displays are effective.						
8. Special features used well: graphics						
sound						
colour						
9. Program provides effective and appropriately clear responses.						
10. Program operates reliably and is free of errors.						
11. Teacher able to intercede and assist student use of package.						

D. ACCOMPANYING LITERATURE INCLUDES:

1. Prerequisites needed by the student user.
2. How to use the program.
3. Sufficient sample runs to cover most possibilities.
4. A list of materials needed to use the program.
5. Suggestions about how and when to integrate the package into a unit.
6. Student exercises and answers.
7. References to topics for further study and follow-up activities.
8. References to standard texts.
9. Information about the limitations of the program(s).

9. School MicroWare Evaluation Form

Description: The school MicroWare Evaluation form was developed by the editor to aid teachers in evaluating software quality. Instructions for the use of the form are included in it. They have found that it takes from 30 minutes to an hour to do a complete evaluation of one program.

SCHOOL MICROWARE EVALUATION FORM

(This form may be copied as needed; for additional information, see School MicroWare Vol. 1 No. 1)

Your Name_____Organization_____Position_____

Product Name_____Supplier_____No. of Progs. Under This Name_____Price $_____

Applicable School Dept/Subj/Topic _____

INSTRUCTIONS - For open ended items, supply all information requested in blanks provided if possible; use extra sheets if necessary. For objective items (those with blanks to left), enter a number in the blank to indicate the extent to which the program fulfills the description in the item, as follows: 2 - Completely, 1 - Partially, 0 - Not at All. If the item is not applicable to the program, enter N/A. If the item is unclear, enter U. Elaborate on answers as necessary in Comments section at end or on extra sheets, giving item numbers.

OVERVIEW - Describe the program briefly in terms of its goals and what it does to achieve them (no evaluation here).

_____

_____

PRELIMINARY CONSIDERATION - Assuming that this program contributes to the teaching of one or more topics, is that topic one which is or should be taught in today's schools? Yes No If not, give your reasons for this answer in the Comments section at the end of the form and omit the balance of the questionnaire.

DOCUMENTATION - List materials accompanying the program, e.g., teachers guide, student workbook.

_____ 1. Indicate types of information included.
  a. Suggested course/subject, grade levels.
_____ b. Goals.
_____ c. Performance objectives.
_____ d. Suggested teaching strateg(ies).
_____ e. Correlation with standard texts.
_____ f. Prerequisites for use of program.
_____ g. Student exercises, teacher answers.
_____ h. Operating instructions.
_____ i. Listing and sample runs of program(s).
_____ j. If a simulation, description of the model used.
_____ k. Suggested topics for follow-up discussions.
_____ l. Suggested references/activities for follow-up.
_____ 2. The documentation is written clearly.
_____ 3. If a workbook is included, the format and content are appropriate.

INSTRUCTIONS GIVEN TO USER BY PROGRAM

_____ 1. The instructions are adequate regarding:
  a. The instructional task to be performed.
_____ b. Details of how to interact with the program.
_____ 2. User has the option of skipping instructions if already known.

STUDENT-COMPUTER DIALOG

_____ 1. Output is displayed screen by screen (paged) rather than scrolled.
_____ 2. If output is paged:
  a. User has control over continuing to the next page.
_____ b. Amount of information in each page is appropriate.
_____ c. The perceptual impact (amount of type and lines) is suitable.
_____ 3. Output is spaced and formatted so as to be easily readable.
_____ 4. Language is well suited to most students' reading ability.
_____ 5. Uses correct grammar, spelling, hyphenation and punctuation.
_____ 6. Any grid or coordinate system used is consistent with common conventions.
_____ 7. Students can respond with common symbols & ways of using them, e.g., right to left entry of sums.
_____ 8. Accepts abbreviations for common responses.
_____ 9. Provides for individual needs, e.g., opportunity to work with harder or easier material.
_____ 10. Dialog is personalized, i.e., makes appropriate use of student names.
_____ 11. Uses devices to get & maintain interest, e.g., variation of computer responses, humor, pace change, surprise.
_____ 12. Makes good use of any special features of computer:
  a. Graphics
_____ b. Color
_____ c. Sound
_____ 13. Reinforcing responses (indications of right, wrong, etc.) are appropriate.
_____ 14. The number of wrong answers allowed is reasonable.
_____ 15. Responds appropriately if allowed number of wrong answers is exceeded.
_____ 16. Provides opportunity to get help if difficulty is encountered.
_____ 17. Minimizes bad entries via devices such as objective formats (multiple choice, etc).
_____ 18. Deals well with inappropriate entries, i.e., response to typing errors, etc., is intelligible and useful.
_____ 19. Required entries are within students' capabilities (esp. typing, vocabulary).
_____ 20. Reports student performance periodically and at end of session.

MISCELLANEOUS CONCERNS

_____ 1. If a simulation, the program gives a sufficiently accurate representation of the situation simulated.
_____ 2. The concepts and vocabulary required to use the program are reasonable.
_____ 3. Operates properly and is free of bugs.
_____ 4. Is well structured and documented internally to facilitate any necessary debugging/modification.

COMMENTS - Please use this space and additional sheets as necessary to provide any other information which you believe would help someone who was considering acquiring the program being reviewed. In particular, indicate what you like least and most about the program. Also, list any changes which should be made.)

_____

_____

B) ARTICLES ON EVALUATION OF EDUCATIONAL SOFTWARE

1. "Evaluating Educational Software", Kleiman, Glenn. Humphrey, Mary M. Buskirk, Trudy Van.
Creative Computing. March, 81. pp. 85-90

2. "How to Evaluate Educational Courseware", Hakansson, Joyce.
The Journal of Courseware Review, Vol. 1. No. 1.

3. "Identifying Good Computer Courseware", Crowley, Mary L.
Nova Math. Vol. 1 No. 1. pp. 39-43

4. "Softswap: The Evaluation and Dissemination of Non-commercial Teacher Created Software", Lathrop, Ann.
AEDS-81 Convention Proceedings, Minn. May 5-8. pp. 173-175.

5. "Software Review", Jostad, Karen.
The MECC Instructional Computing Newsletter. March 82. Vol III. No.4

Photos courtesy Morristown Daily Record.

Glenn Kleiman Mary M. Humphrey Trudy Van Buskirk

EVALUATING EDUCATIONAL SOFTWARE

Educators are rapidly becoming aware of the potential of microcomputers. Currently available, relatively inexpensive, computer hardware is capable of providing powerful and flexible tools for teaching. Computers can be used to individualize instruction, maximize children's attention and present material in new ways through the use of graphics and simulations. Computers can be tutors that provide appropriate levels of instructions and questions for each individual. They can provide immediate feedback to students' answers, and they are infinitely patient. They can also keep detailed records of each student's performance.

Unfortunately, much of this potential remains unfulfilled. By itself, a computer is a dormant set of electronic components. No matter how potentially powerful, the usefulness of a computer is determined by the software available for it.

The development of educational software lags far behind the development of hardware. Many of the available programs are poorly designed, do not take advantage of the potential of computers, and are difficult for students and teachers to use. We fear that the use of poor software will discourage some educators from using computers at all.

Some good educational software is available, and much more should be available in the near future. Our aim in this article is to present guidelines for selecting good software. We will discuss the general principles that we, as educators, psychologists and computer specialists, believe should form a basis for both software development and software evaluation.

Since we will focus on general principles rather than specifics, what we have to say is relevant to a wide variety of teaching programs, topics, students, and computer systems. The guidelines are presented as questions one should ask about any computer software designed for educational use.

First we will discuss three very general questions. Then we will turn to more specific questions that are based upon the three general ones.

One general question is: *Does the software follow good educational practices?* Much of the available educational software seems to have been written by computer programmers who do not know much about education or the abilities of the children who might use the program. Such software may be of high quality from a programming point of view, but it often contains serious flaws from a pedagogical point of view.

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For example, educationally well-designed programs present material in small, well-sequenced units. We have seen many programs that present too much material at one time, and present it in ways that may be confusing to many children.

Another good educational practice is to provide immediate feedback when the student makes a response. Computers can be programmed to do so, but many programs do not take advantage of this capability.

Other programs make poor use of the graphics capabilities of computers. A common fault is using graphics in ways that distract the child from the material to be learned.

Another general question is: *Is the software suitable for the intended purposes and users?* Some educational software does not present a reasonable progression of material to be learned and therefore will not fit into any curriculum.

Other computer programs are not acceptable because they are difficult for students and teachers to use. Many lack adequate instructions, do not take into account the reading level of the intended users, require complicated procedures to enter answers, or stop operating if the user makes an inappropriate response.

The remaining general question is: *Does the software take advantage of the capabilities of the computer?* The major reason for using computers as educational tools is that you can do things with computers that cannot be done, or are much more difficult to do, without them. However, computer programs often do not take advantage of the capabilities of the computer.

For example, we consider programs that are basically written pages moved onto the computer screen, in which the computer simply acts to turn the pages, to be a waste of computer resources. Some lessons are better presented with other media. Since most schools do not have an abundance of computers, the available computers should be used for those types of lessons for which they offer strong advantages.

We now turn to the more specific questions, each of which reflects one or more of these general concerns.

Does the Program Fulfill Its Purpose?

Computers can be used in teaching a wide variety of topics, and one must decide whether a given program fits into the curriculum being used. Once a match between the curriculum and a software package has been found, there are several other considerations regarding the role of the computer.

One must decide whether the computer will be used in the initial teaching of the material, for review or practice, for testing, for record keeping, for facilitating general skills, or for some combination of these functions.

Deciding which of these purposes one wants a given program to serve is an important step in evaluating the potential usefulness of the program.

Computers can be helpful in the initial teaching of material. For example, computer graphics and animation can provide useful visual aids. In some cases, computers can substitute for the teacher and textbook and actually teach the material.

Another possible role for the computer is to review lessons or present drill and practice. Since they are infinitely patient, computers can be especially useful for those students who need more repetition. Programs can be written to ask the student questions and give feedback when he answers.

Since computers can keep track of students' performance, they can also serve in testing and in record keeping. Well designed testing programs allow the teacher to enter questions and acceptable answers. Various criteria can then be set to individualize the test for each student. For example, programs can be designed to vary the difficulty of the questions presented depending on how many the student has answered correctly. With a printer, connected to the computer, written records can be produced automatically.

In addition to helping children learn and master specific material, computers can be important in facilitating general skills. For example, many computer games provide good practice in eye-hand coordination, making rapid responses, and maintaining attention. Other computer games exercise general problem solving and creative skills.

Does the program use sounds or graphics that might distract other children in the room?

Is the Software Appropriate for the Situation In Which It Will Be Used?

When evaluating software, one should keep in mind where and when it will be used. Will an adult be present to assist the student, or should the student be able to use the program without assistance? Will children work individually or in groups?

If they will work in groups, one should consider whether the program is designed so that children can share the work or alternate entering responses.

How often will each child use the program, and for how long? If a program is very repetitious, it might be suitable if it will be used only occasionally and briefly.

If a program is fairly complicated and will take a while to learn to use, it will be suitable only if sufficient computer time is available. Finally, will it be used in the classroom and, if so, does it use sounds or graphics that might distract other children in the room?

Is the Software Suitable for the Intended Users?

As we mentioned above, much of the available educational software seems to have been produced by computer programmers who know little about the children who might use the programs. One important area of concern is the instructions provided with the program.

Many educational programs do not provide adequate instructions. Often the instructions designed for the child are unsuitable because of the reading level required. For example, we have seen instructions requiring high school level reading in math programs designed for grade school children.

Many programs also fail to provide adequate intructions for the teacher on how best to use the program. In several programs, we have happened upon useful features that were never mentioned in the instructions.

Another important concern is how the user makes responses. There are many ways in which information can be entered into a computer. The most common ones use typewriter or calculator style keyboards. Young children can usually use these to enter single letter or digit answers. However, entering entire words or sets of words may be too difficult for young children.

Other input devices can be attached to computers. Light pens enable responses to be made by pointing at a particular part of the screen. Using a light pen, a child can answer multiple choice questions without needing to find the appropriate keys on the keyboard.

Other devices, such as joysticks and game paddles, also provide easy ways of making responses.

The pacing of the material being presented should also be considered. In some programs it is completely controlled by the computer. In other programs the material is presented in small units and the user presses a key to advance to the next unit. Since different children work at different rates, we generally prefer programs where the pacing is controlled by the user. The main exceptions are programs used to increase speed, such as

in rapid word recognition. Even in these programs, there should be a range of speeds available so they can be used with a variety of children.

Does the Software Adapt the Computer to the User or Must the User Adapt to the Computer?

A very important consideration, often neglected by programmers, is whether the students and teachers will be able to use the program easily and comfortably. Psychologists call this area human factors—considering the people, not the machines.

Most addition programs provide examples of programmers' failure to adapt the computer to the user. When children do addition problems with paper and pencil, the addends are usually written one below the other, with the columns in line. The children work the problem from right to left, and mark carrying from one column at the top of the next.

Many addition programs present the problems with the addends side by side, require the answers to be entered from left to right, and do not provide any way of marking carrying. In using these programs, children often copy the problem, work it on paper, and then enter their answer into the computer.

Programs that present problems this way force the user to adapt to the computer. With more effort on the part of the programmer, the computer could have been adapted to the user.

Other examples of failing to adapt the computer to the user include using "*" instead of "x" to indicate multiplication, not providing any way in which mistakes can be erased, and filling the screen with so much information that it is difficult to read.

Another thing that makes programs difficult to use is lack of consistency. One should check whether the way information is entered is consistent within the program, and, if possible, is consistent with other programs the children might use. For example, on the PET computer a key marked DEL (for delete) is usually used to erase responses. A program that uses some other key, or does not allow erasing, or only allows erasing some of the time, may confuse children who are accustomed to using the DEL key.

We hope that educational programmers will agree to a set of standard input procedures in the near future. As things stand now, educators should look for sets of programs that operate in similar ways.

Another problem good programmers should consider is that users do not always make the expected response. For example, given a choice of pressing "Y" for yes or "N" for no, an uncertain child might press "M" for maybe. Children often press keys just to see what will happen, and we have observed children pressing an "Erase" key to try to erase a difficult question. Good programs are prepared for inappropriate responses, so that these responses will either be ignored or result in a message such as "try again."

Given a choice of pressing "Y" for yes or "N" for no, an uncertain child might press "M" for maybe.

Poor programs are not child proof and may "crash" when inappropriate responses are made. When testing any program, one should make sure that inappropriate responses will not disrupt the program.

Does the Software Take Advantage of the Capabilities of the Computer in Presenting the Lessons?

Many lessons, creatively designed, can take good advantage of the graphics and sound capabilities of the computer. Any lesson where animation or interactive graphics can be useful is better presented on a computer than a book.

For example, many lessons in physics, such as those on wave forms or vectors, can benefit from animated representation of the phenomenon being studied.

Other examples include programs that produce maps and point to them during lessons, programs in which graphs are produced and revised to support the information presented, and programs which enable the user to, in some way, draw on the screen.

Other lessons, such as those in music, can take advantage of sound generation capabilities—the student can both see the note on the screen and hear it, different sequences can be played, and so on.

In addition to using the built-in capabilities, other devices can be interfaced to computers. Sound can be easily and inexpensively added to computers that do not have it built-in. Interfaces have been designed to enable computers to control tape recorders, slide projectors, and video recorders. We hope to see greater educational use of computers controlling these presentation devices.

Is the Program Adaptable to Different Children and Teaching Methods?

A good educational program can be easily adapted for different users. For example, a program that can only present 10 addition problems, with each problem having two addends and two digits per addend, is very poor. A program that allows you to specify the number of problems you want is a small bit better. A program that allows you to set different difficulty levels for the problems as well as the number of problems is much better. A program that also gives you the option of using subtraction, multiplication or division problems is better still. The lack of this type of flexibility is one of our most common criticisms of available programs.

Some software companies market a large package of programs where one flexible program would serve the same purpose and be much less expensive.

For example, one company sells sets of 24 spelling programs. Each program contains a small number of words, and the only differences among the programs is in the word lists. It would not be difficult to write a similar program in which the teacher could input his own spelling words. This program could sell for a fraction of the price of the large package.

When obtaining flexible programs, one must be careful that they are easy to modify. Some provide a simple "menu," from which the user selects the desired options by pressing one or two keys. Menus are very easy to use. Other programs require the user to change the program itself, usually by modifying DATA statements or changing the values assigned to certain variables.

Will the Program Hold the User's Attention?

Another important question is whether the program will capture and hold the

"I'd get more work done if it would pause for commercials."

user's attention. Properly designed educational programs have been successful in keeping even the most distractible children engaged in a task for surprisingly long periods of time (see "Microcomputers and Hyperactive Children" by Kleiman, Humphrey and Lindsay in *Creative Computing*, March, 1981).

The graphics and sound capabilities of microcomputers, properly used, can hold children's attention. Improperly used graphics and sound can quickly become annoying and discourage use of the program. When examining these aspects of a program you should determine not just whether they are initially captivating, but whether they will remain so with repetition.

For example, a program that displays a rocket ship slowly rising on the screen, or plays a melody after each correct answer, might be initially motivating. However, after one has seen or heard this ten times it will probably become tiresome. We find that graphic and sound reinforcement which is used repeatedly should be rapid (i.e., two to three seconds) and varied. Different pictures or tunes hold attention much better than the same one or two repeated frequently.

The pacing of the program and the frequency of user responses also affect how well it holds children's attention. A program in which the child has to wait long periods, or which moves more quickly than the child can read or give answers, will not hold the child's attention. Likewise, the more frequently the child must make a response, rather than simply watch the screen, the more likely he will stay engaged in the program. Receiving immediate feedback to their responses also helps hold children's attention.

In many cases, educational material can be presented in a game format. We do not believe that all educational programs need to be forced into games. However, the competitive nature of games often does hold children's attention. The competition can either be against one's own prior performance, against the computer, or against another person.

Game programs should be checked to make sure the children will be able to play reasonably well, but still find the game challenging. A game which is too simple or too difficult will not keep one's interest. The best game programs allow the user to set the level of play—e.g., present the older or more capable users with more difficult questions or less time to perform the task.

A good computer program—particularly one designed for use by children with concentration problems—can monitor the child's responses and provide special messages. For example, the program can measure the time between the user's responses, and flash a special message or sound a buzzer if there is no response for a long time. We have not found many programs that do this, but we have found it useful in our research.

Does the Software Provide Useful Feedback to the User?

One of the major advantages of computer-based learning over other media is the capability of immediate feedback. As we mentioned above, immediate and frequent feedback helps keep childrens' attention on the task at hand, and this is especially important for children with attention problems. The right feedback at the right time is also important for facilitating learning.

Besides the motivating reinforcers for correct responses, an important aspect of a program is how it responds to incorrect responses. One poor but common type of response is simply to tell the child that he is wrong, and go on to the next part of the program. Some programs, written without any thought about who might use them, even display insulting messages after a wrong response. Messages from a computer such as "Wrong, Dummy" may be humorous to some adults, but can upset young children.

Messages from a computer such as "Wrong, Dummy" may be humorous to some adults, but can upset young children.

One good practice is to provide the child with a second chance when an incorrect response is made. For some purposes, this is best combined with a prompt of some sort. For example, a spelling program might tell the child which letters are incorrect, and then have him try to spell the word again. In programs where the questions are based on an immediately preceeding lesson, the appropriate section of the lesson might be repeated when the child does not answer a question correctly.

Another alternative is to give the child the correct answer. Depending on the content of the lesson, this may be best after a single incorrect response, or it may be better to give the child several tries before giving the correct response. In either case, a good practice is to provide some way for the child to compare his answer with the correct one, or to spend some time studying the correct one.

For example, in spelling programs the child should have to type the word correctly after being shown the correct spelling. Another good practice is for the program to store a record of the questions or problems the child answered incorrectly. These can be repeated later on, or given to the child at the end of the lesson for further study.

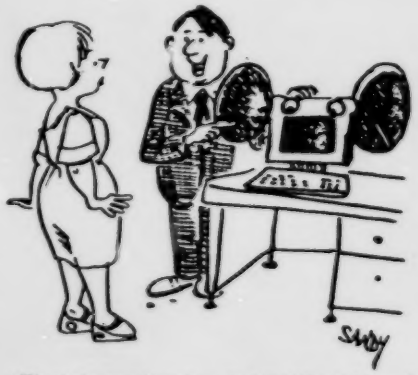
We have seen programs where the most interesting graphics and sound displays occurred in response to incorrect answers. These programs should be avoided, as they encourage children to make incorrect responses just to see what happens.

Other programs are designed to accept only the correct response. For example, some math programs will not let any but the correct number appear on the screen—if the child presses an incorrect number nothing happens. Faced with this type of program, some children just press all possible keys until they happen to hit the correct one, without paying any attention to the math problem. Clearly, this is not a recommended practice.

Conclusions

We have discussed several questions to be asked when evaluating educational software. All of them reflect three general requirements for quality educational software: 1) It must follow good educational practices; 2) It must be suitable for the intended purposes and users; and 3) It must take advantage of the unique capabilities of computers. Within these three general guidelines, which of the specific questions is most important depends upon the material being taught, the teaching method, the students' abilities, the available computer hardware, and other factors specific to each situation.

We hope this article will help teachers, educational administrators, and parents choose the best available educational software. We also hope it will encourage and facilitate the writing of good educational programs. □



"We at electronic gadgets feel the Minnie Mouse® style CRT is less intimidating for the younger or the timid child."

How to Evaluate Educational Courseware

Joyce Hakansson

Judge a computer program as you would any other educational material.

The advent of educational microcomputer technology has loomed as a threat to educators and administrators alike. Parents expect teachers to be instant experts; knowledgeable in the use of computer-assisted instruction (CAI), courseware development, and classroom application. The fact is that educators have the skills and expertise to absorb this new technology. The computer is a new delivery system, and its value is dependent on the quality of instruction it delivers. Using the author's suggested questions as guidelines, it is possible to develop a "critical eye" when reviewing educational software.

As a variety of "educational" microcomputer programs reach the marketplace, educators and administrators must become instantly informed computer-software experts. Educators with tight budgets and little computer experience are being asked to evaluate and purchase programs for school microcomputers. These individuals are finding many questions to be addressed, from "where to look for available software" to "how to decide which of the available programs to purchase." This article is intended to provide some help with the first question and to provide a few basic guidelines to assist with the second. The proposed evaluation tools are very informal, primarily a series of questions to ask when considering the purchase of a program.

Does the Program Run?

It is to be hoped that this question will soon be removed from the list, but right now it must be the starting point for any evaluation. When the program is loaded into your computer, does it proceed from beginning to end? Try answering some questions with "wrong" answers; press some keys that students might press by mistake (zero for O, 1 for L) and see how the program reacts. Ideally, it should help the user when a mistake is made or should wait for entry of another answer. It should not freeze or stop running.

Is the Program Easy to Use?

The program should be consistent in the way it gives and receives information. A well-designed program uses and reinforces conventions that transfer to the standards used in other academic disciplines. For example, the program should indicate how the user is to signal the computer that s/he has responsed to a question and that the user wants to proceed. Some programs prompt the student to "press any key to proceed"; others just proceed automatically when a key has been pressed. Some advance automatically after a certain period of time

elapses, still others prompt "press return to continue," and some do all of the above at various times throughout the program. The programmer should use a consistent format and ask for only one of the above responses whenever the user wishes to proceed.

The popular choice is to use "press return . . ." because this convention conforms to the format used in computer programming. In the same way, when coordinates are introduced, the labeling of points, such as x, y, etc., ought to conform to the techniques used by mathematicians. Instructions or other text ought to use correct grammar, words should be spelled correctly, and sentences should be punctuated. (There is an extensive research project, MICROSIFT in Portland, Oregon, that is currently developing a formal tool for educational computer programs.)

Is the Activity Educationally Sound?

Judge a computer program just as you would any other educational material. Do not let the technology overwhelm or distract you. Trust your own judgment. The computer is a delivery system, and its value in this setting is dependent on the quality of the program it is presenting. Some of the specific questions to be asked about the program are:

a) Is the presented activity appropriate to and integrated into the concepts to be taught?

b) Is the activity appropriate for the age of the student user?

c) Are the called-for responses reasonable tasks for this user?

d) Does the computer enhance this activity, or is the activity more suited to another medium, such as print or film?

e) Is the program attractive and interesting?

Who is in Control— Student or Machine?

Programs ought to be constructed so as to put the student in control of the machine, not vice versa. When text appears, the student should have control of the length of time it stays on the screen. The student should have as much time as needed to read and understand the information. When ready, the student can make the machine continue by pressing the return key. The alternative is to have the computer continue at a predetermined pace, whether the student is ready or not. Allowing the person to pace the lesson individualizes the program and adjusts for differences in speed of reading and comprehension. It also provides the student with a sense that the computer is a tool providing information rather than a taskmaster.

Does the Program Present the Concept to be Learned in a Harmonious and Well-Balanced Way?

A computer can deliver information in a variety of ways. The most common are through text printed on the screen, graphics, and sound. Each of these elements in a program should support and reinforce each other and should help the student focus on and understand the educational purpose of the program. Printed text must be presented so as to be easy to read. Within the limits of the technology, it should be placed on the screen in such a way as to attract the student's attention and quickly convey the needed information.

The graphics should support and reinforce the learning that is the purpose of the program. All too often, a colorful graphics display is introduced to "reward" the learner for a correct response but has no relationship to the learning that has taken place. In this situation, the graphics quickly become distracting and get in the student's way, diverting attention from the real purpose of the program.

Sound, too, can, if not used in harmony with the other parts of the program, distract rather than add to the learning process. Sound can provide clues to the learner, call attention to the screen, and can, when used well, provide a very powerful addition to the computer's ability to teach.

The important thing to look for is a well-balanced program that guides a student successfully through a learning experience, utilizing all the capabilities of the machine in a harmonious blend. Devising good computer programs is a creative art as well as an intellectual skill. Evaluating software, therefore, depends upon developing a "critical eye" through experience in using programs and observing how students use them.

Educators have the right and obligation to become critical evaluators of the educational software being produced and distributed. The guidelines presented here will help you begin this evaluation process.

Joyce Hakansson, Director of Computer Development at Children's Television Workshop (CTW), New York, was responsible for the design, courseware development, and installation of the Computer Gallery in CTW's Sesame Place, a prototype family educational and recreation center recently opened in Longhorn, Pennsylvania. Formerly coordinator of computer education at Lawrence Hall of Science, Berkeley, California, Hakansson was involved in the development, implementation, and introduction of the Apple Van, a mobile science shuttle that transports microcomputer-literacy demonstrations and model-classroom applications to San Francisco's Bay Area schools.

They are in no sense complete, nor are they meant to be. All individuals will develop their own criteria, weighing items differently, depending on the setting, the audience, and the educational goals to be met. In all cases, the concepts must be presented in a way that make them accessible to the audience for whom they are intended.

IDENTIFYING GOOD COMPUTER COURSEWARE

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Rapid advances in technology coupled with declining production costs have resulted in the entrance of the computer into the classroom. Whether this is seen as friend or foe, fixture or fad, depends to a large extent on the quality of the resultant education. It is not surprising, therefore, that the problem of identifying good courseware is of major concern to teachers.

Some of you will be gifted programmers (as will be some of your students) and will develop programs to meet your personal teaching objectives. Most of us, however, will have to rely on courseware prepared by others -- both commercially and those our colleagues will write. This can be frustrating and expensive if the materials do not meet our expectations. Given that much of the courseware used in our schools will be written by someone else, there are three major concerns surrounding its selection. How does one get courseware for review? How does one evaluate courseware once it is obtained? How does one get good information about courseware when factors such as time and money rule out personal evaluation? None of these questions is easily answered.

In discussing the three questions raised above it is essential that terminology be clearly understood. The term "package" is used in NOVA MATH to mean a program or collection of programs. Many programs have accompanying literature such as a sample, if not complete, listing of the program and, with educational packages, a teacher's guide and/or student workbooks. It is not unusual for these printed materials to be called "documentation ". That term, however, is also used to refer to notes within a program. To avoid confusion, this journal will use the term "accompanying literature" to mean the written information provided as supplementary to a package. Collectively, a package and its accompanying literature will be refered to as "courseware".

Obviously, courseware may be obtained directly from a publishing company or through a local distributor or computer representative. If you know you are interested in a particular package, ask the publisher for a preview copy. Don't be surprised, however, if they do not allow review copies to be distributed. Too many people illegally copy a package on loan, then return the original without purchasing it. Because of this, many courseware distributors have been forced into requiring purchase without preview in order to make a profit. Nonetheless, ASK! You may be pleasantly surprised. Alternatively some companies, especially for a set of programs, will distribute a demonstration disk free or for a small fee. You can then base your decision to buy on your evaluation of that sample without having to purchase the entire set blind. Another way to preview courseware before purchase is to ask your local representative to schedule a

demonstration session. He may be particularly responsive if he knows you have invited several other prospective buyers to the viewing.

With the increasing educational use of computers, many of your teaching colleagues will be good sources of courseware information. Call other schools in your area to see if they have courseware you are interested in. If they do , you will be able to learn about their classroom experiences as well as preview the material. If they don't have it, perhaps they have something as good (or better!) which they would share with you. At the very least, you may have found another source of information about the use of computers in the school.

Many professional organizations are also concerned with the impact and uses of computers in education. Often information about courseware, if not the courseware itself, is shared at the conferences sponsored by these groups. In mathematics, the National Council of Teachers of Mathematics and the Nova Scotia Mathematics Teacher's Association have both recently expanded their conference offerings to include computer related topics. Sessions have ranged from the history of computers to how to use computers for instruction, research and information management.

Once you have acquired a package, you need to determine its suitability for your teaching purposes. It is important to realize that you do not have to be a computer expert to identify educationally sound courseware. The criteria we currently use for selecting textbooks, workbooks, audiovisual aids, etc. can be applied towards evaluating courseware. It is still important to ask if the activity is appropriate for the academic abilities of the student user, if the courseware enhances the student's understanding of the concept being

developed, if the lesson can be better taught using another medium, and if the courseware is interesting, etc.

The form in the middle of this journal is a suggested guideline for evaluating computer courseware. The first section deals with general information--package name, purchase details, machine requirements (remember a program written for a PET will not run directly on an APPLE and vice versa as there are different versions of BASIC used), intended audience, and type of instruction. Next, space for a short descriptive statement about how you use the courseware is provided. The third section asks for a description of the interaction possible between the user and the program. While it might be of interest to some readers to discuss the internal structure and programming steps with a program, we have adopted a black box approach (i.e. we are considering only what is input and what is output as opposed to the internal mechanics of the running of the program). Section four is concerned with the nature and quality of the accompanying literature and the last section provides an opportunity for an open-ended discussion of the courseware.

These guidelines should be useful both to those reviewing courseware and to those who intend to program on their own. The editors of NOVA MATH would appreciate knowing from those of you who use this form, as well as those of you who have had other reviewing experience, how this list might be strengthened. If there are important omissions or if there are entries which are of little help, please tell us. We are striving to develop a form which summarizes courseware accurately, clearly and concisely. While we are aware that many other guidelines are appearing, most recently one from NCTM, we feel the

strength of this form will be that it is designed by a local audience to meet local expectations.

The third question raised at the beginning of this article dealt with obtaining good courseware descriptions when personal previewing is impossible. As we have seen, obtaining courseware is not always easy or feasible. Thus, we will have to rely on others for our information. Often, however, when you do find a review of a particular package, the meanings of the terms are unclear, it does not describe the characteristics which are of interest to you and/or you do not know how reliable the reviewer is. NOVA MATH hopes to avoid the first two problems in that it can serve as a dependable and useful source of courseware information. In addition to presenting articles of general interest to computer users, we intend to devote the middle section of each issue to courseware review. To do this effectively, we need your cooperation and contributions. If you do like a package or if you do not like a package, fill out the evaluation form on the centre pages and send it to Glane Gorveatt, Computer Editor, NOVA MATH, Department of Mathematics, Statistics and Computing Science, Dalhousie University, Halifax, Nova Scotia, B3H 4H8.

The introduction of the microcomputer into the classroom has put many teachers in the position of having to make decisions about their use without much training or support. Educators with small budgets and minimal computer experience are finding it their responsibility to acquire and evaluate courseware for student use. However, teachers do have the skill and expertise to make informed decisions, provided they have useful evaluation criteria and a dependable information network. With your support, NOVA MATH will help in meeting these goals.

SOFTSWAP: THE EVALUATION AND DISSEMINATION OF NON-COMMERCIAL TEACHER CREATED SOFTWARE

Ann Lathrop
Library Coordinator
San Mateo County Office of Education

An educational software library for microcomputers has been established in the Microcomputer Center of the San Mateo County Office of Education in Redwood City, California. It is a joint project of the County Office and Computer-Using Educators (C.U.E.). The non-commercial public domain programs contributed to the Center by teachers and other educators have been evaluated, edited and organized into the SOFTSWAP, a free exchange of instructional software for classroom use. Approximately 200 programs are currently available in the SOFTSWAP for use with the five microcomputers in the Center: TRS-80, PET, Atari, Apple & Compucolor. Visitors to the Center may copy programs without charge and disks of programs are also available for mail-order sales.

The Microcomputer Center and SOFTSWAP in the San Mateo County Office of Education have grown from a dream into a reality in just over a year. The moving force behind the Center is a California based group of teachers and administrators, Computer-Using Educators (C.U.E.), who are dedicated to expanding the educational uses of microcomputers in schools. Administrators within the San Mateo County Office of Education, under the leadership of Superintendent William K. Jennings, worked cooperatively with members of C.U.E. to establish this resource center where educators can experiment with five different microcomputer systems, preview a wide variety of commercial software for use on these microcomputers and copy any of the approximately 200 public domain instructional programs that make up the SOFTSWAP.

HISTORY

We receive many inquiries from educators in other areas who would like to replicate the Center that we have established. In our reply we stress the fact that none of the activities sponsored by the Microcomputer Center would be possible without the strong support of C.U.E. members. Computer-Using Educators was founded in 1978 by Dr. William (Sandy) Wagner, currently the Microcomputer Consultant for the Santa Clara County Office of Education in San Jose, CA. In less than three years the group has expanded from the small group of founders to a present membership of over 800, with members in 28 states and 8 foreign countries. Under the current president, Mrs. Bobby Goodson, C.U.E. is continuing to support a strong program of workshops, conferences and other meetings designed to expand the use of computer technology in education.

The SOFTSWAP originated as an exchange of educational software at the 1979 Annual Conference of the California Mathematics Council (Northern Section). This first venture was organized by Vince Contreras from San Jose State University. The programs contributed by participating teachers were deposited in the newly established Microcomputer Center in the spring of 1980. Teachers, administrators, students and other interested volunteers worked through the summer to evaluate, edit and revise these original programs. As new programs continue to flow into the Center they are routed to C.U.E. volunteers for evaluation and processing. Finished programs are placed onto SOFTSWAP Dissemination Disks which can be copied by anyone coming into the Center.

An increasing number of requests from outside the San Francisco Bay area encouraged us to begin a mail-order distribution service this spring. Our first catalog, which was published in the CUE NEWSLETTER, listed approximately 200 programs. We expect to receive more programs as word of the SOFTSWAP project spreads. These also will be evaluated and processed for dissemination.

SOFTSWAP PROCEDURES

What makes the SOFTSWAP unique among the many users' group libraries available across the United States? The primary distinction is one of focus--

SOFTWARE REVIEW

by Karen Jostad

Title of Product: Mathware: Basic Math

Produced by: Math City
4040 Palos Verdes Dr. N.
Rolling Hills Estates, CA 90274
(213) 541-3377

Support Materials: Teacher manual

Cost: $59.00 each diskette (5 in all)

Equipment: Apple II Plus—48K with single disk drive
Applesoft BASIC & DOS 3.2

Product Description by Math City

"You have not bought a simple drill program. You have purchased a powerful teaching system that is very simple to use and yet extremely sophisticated in operation. Although invisible to the user every question asked carries with it a "tree" - - which branch of the "tree" the computer selects is determined by the student's responses. Every branch, question, lecture, explanation, and comment has been given meticulous thought and extensive testing. We at Math City hope our mathware helps to develop a greater understanding and appreciation of the beauty of mathematics."

Diskettes available in the Basic Math series are as follows:

Addition and Subtraction
Multiplication and Division
Fraction Concepts and Operations
Decimal Concepts and Operations
Ratios and Percents

MECC Classroom Review Situation

June Hendrickson of Washington Elementary School in Hibbing, Minnesota used two diskettes from the Basic Math series: "Decimal Operations and Concepts" and "Multiplication and Division". Students of all ability levels in her sixth grade class worked on the programs individually. Twenty-four students used the Decimal diskette, and twelve used the Multiplication/Division diskette. Students used the materials an average of thirty minutes each. The materials were also reviewed by Lois Edwards, a mathematics educator on the MECC Development staff.

MECC Evaluator's Critique

1. Educational Content or Value

June Hendrickson comments that the series "treats learning of math concepts as serious business, not just fun." The content of the drills is accurate. The amount of material covered in any one diskette is exhaustive. The designers of these materials took the usual drill and practice type program a step further and developed what might be termed "guided drill". The student receives help either as the result of answering incorrectly or by requesting the help. The student is never actually taught an operation in the sense of a tutorial in which the student learns "why" things are done in certain ways. Rather assistance is provided by showing the student the procedure to follow in a particular operation. By doing the problems the students are developing an intuitive understanding of the rule for the operation.

Integrating the material into a classroom requires preparation time. The teacher must become familiar with the instructional material keyed to each concept area and with the way a change in difficulty level alters the problems presented in the drill. Neither the documentation or program tells how the problems in each drill vary in difficulty level or number of problems presented.

2. Ease of Use

No problems in using the programs were revealed during classroom review.

3. Level of Student Interest

The majority of students who used the diskettes stated that they would like to do more lessons. In response to the question of whether the lesson was fun, OK, or not fun at all, the majority responded "OK" or "fun", with very few responding "not fun at all". The teacher reported that the amount of time students spent on each lesson and their desire to do more lessons varied greatly with the types of problems they were doing. The extremely repetitive drills were not popular, while the drills with more novel presentation and more varied problems were successful in holding student interest.

4. Use of Computer Capabilities

A student noted on her evaluation form, "I like the program on volume because it had pictures instead of having just numbers." Volume is one of the few topics with which the designers used graphics.

The problems in the drills cannot be worked on the computer. They must be done in the mind or on paper. Only the answer is entered in the computer. Record keeping allows for retention of information on only one student at a time. Feedback to the student sometimes contains slang or discouraging comments such as "nothing of the kind!", "now you're cooking!", "my transistors tell me . . .". There are instances of poor screen formatting, such as multiple flashing cursors, erasure of parts of the screen needed for reference by the student, and scrolling. On the positive side, many math operations are covered per diskette, and a choice of five difficulty levels is provided.

5. Support Materials

The support booklet is brief but necessary. It describes the use of each option in the program and lists the concepts covered in each of the five diskettes.

Evaluation Summary

The most positive aspect of these materials is their comprehensiveness. They thoroughly cover and provide drills for a great number of basic math operations. In addition, they are technically sound.

The record-keeping restriction of only one student is difficult to work with in a classroom. This seems to limit the use of these materials to remedial work for specific students. They also have use for home-bound or home learning situations, the environment for which these materials were actually designed.

Although the cost of these materials is not prohibitive, other drills are available commercially at a similar price in which students work problems on the computer rather than on paper.

8) Do you provide hints and/or eventually give the user the correct answer? We usually allow only 3 or 4 incorrect responses before providing either a hint or the correct response, often with some instruction or explanation. Exceptions are programs which are tests or timed drills for accuracy.

Two other factors are considered when evaluating programs for the SOFTSWAP. We try to be sure that the program submitted is truly an original creation of the author. If it is an adaptation from another program or from a book or journal we want to be aware of that fact. We will then request the author's permission to include the program in our collection. If we discover that a SOFTSWAP program is actually an infringement on someone else's copyright we remove it from the dissemination disk.

Finally, the most exciting programs which we receive are the creative ones that do more than just put workbook pages and drill problems onto the computer screen. Software is improving as educators become more sophisticated programmers. Newer programs are often more challenging to the student user and make far better use of the unique capabilities of the computer. We are especially pleased when we receive donations of this type of program and take special pride in being able to make them available to other teachers through the SOFTSWAP.

PREVIEW OF COMMERCIAL SOFTWARE

The third function of the Microcomputer Center is to serve as a display area for copyrighted commercial educational programs. Many software firms have provided sample copies of their instructional materials for preview by visitors to the Center. We have also been able to purchase some exemplary programs with funds from the San Mateo County Office of Education. Our goal is to make available selected software for each of the five microcomputer systems in the Center in order to demonstrate the special features of the system. We also want to give the potential user some idea of the range and quality of materials available in various subject areas at both the elementary and secondary levels.

THE MICROCOMPUTER CENTER

A unique feature of the Center's development has been the close and continuing cooperation between Computer-Using Educators and the San Mateo County Office of Education. Visitors to the Center frequently ask about our funding. To date we have not received any outside grants or other financial aid. The Center is supported in part by the County Office as a service to the educators in our county and throughout the San Francisco Bay area. Hundreds of hours of volunteer time are donated by C.U.E. members as they participate in the educational activities and demonstrations scheduled at the Center. C.U.E. members also contribute the expertise needed to evaluate and edit the instructional programs in the SOFTSWAP. County Office staff, including the author, provide the organization necessary to maintain the SOFTSWAP and other projects.

Manufacturers of microcomputer hardware have also been generous in their support of the Center. Tandy Radio Shack and Commodore PET provided the first microcomputer systems and thus initiated the support that has made possible all subsequent development. Each firm set up a complete system with microcomputer, dual-disk drives, printer and cassette-recorder--all on long-term loan to the Microcomputer Center. A library of commercial programs loaned to the Center by each firm includes educational software and word processing systems.

Other firms providing equipment for the Center include Atari, Apple and Compucolor. All of the systems are on long-term loan; the Center has not purchased any hardware. C.U.E. members were of great assistance in contacting the various firms and securing their support and cooperation.

All of the manufacturers have been helpful in maintaining the equipment in good condition, despite the heavy use in the Center. They also provide new models as they are developed. This strong commitment on the part of the manufacturers has been a crucial factor in our success.

STEERING COMMITTEES

The development of the Microcomputer Center has been characterized by cooperative interaction of County Office staff from several divisions within the office. The Microcomputer Center is located in the Educational Resources Center Library, under the direction of Dr. Curtis May. The SOFTSWAP is coordinated by Ann Lathrop, author of this paper. Dr. James Fee, Director of Media Services, offers assistance with hardware applications and demonstrations. Curriculum development programs and in-service training are the responsibility of LeRoy Finkel, computer consultant, and Walter Smithey, math-science consultant, working under the direction of Tom Quinn. Dr. Al Grossman, Administrator of the Office of Information Services, has developed an extensive program that will interface computers in the County Office to the microcomputers in the Center and in schools throughout the County.

Utilization of this team approach assured a broad base of support and has made the Center responsive to the needs of many different groups within San Mateo County. The entire project is under the administration of Dr. Don Halverson, Assistant Superintendent for Educational Support and Planning.

Four members of Computer-Using Educators served on the Steering Committee for the Center and for the SOFTSWAP. Jim Love (PET), Brian Sakai (TRS-80), Dave Stone and Bob Enenstein (Apple) contributed the time and effort necessary to guide the Center through its first year and to create the SOFTSWAP.

SUMMARY

We have achieved our goals of providing equipment for demonstration, commercial software for evaluation and public domain programs which can be copied by teachers for classroom use. The working partnership between C.U.E. and the San Mateo County Office of Education has created a Center which we feel has a significant role in the developing uses of microcomputers in education.

SOFTSWAP concentrates on the development of educational software. Most of the programs are short, stand-alone instructional units. Many are drill and practice exercises written for the elementary school or for remedial work at the secondary level. About one-third of the programs are math oriented. Most games have been excluded since these are generally available from many other sources. Only a few utilities, those of special interest to teachers, were on the first series of SOFTSWAP disks; these also are readily available from many user groups.

A second feature of the SOFTSWAP is the fact that every program is evaluated by at least two educators before it is added to a Dissemination Disk and made available for copying. Programs are edited for spelling errors, inaccurate or incomplete instructions, errors in factual content, programming errors and other problems. Our goal is to distribute only those programs which have some educational value and which are as free of errors as possible in both content and programming.

We have developed a very workable system for processing new educational programs donated to the SOFTSWAP. The entire procedure operates with part-time clerical staff, paid student assistants and volunteers from C.U.E.

Each donor is asked to complete a PRELIMINARY INVENTORY FORM (blue) that identifies and describes the program and a RELEASE FORM (green) that gives C.U.E. permission to distribute the program. The donor's form also asks whether the program is origiral, a modification of another program, or an adaptation from a magazine or book listing.*

Each donated program is first loaded onto a "Receiving Disk" where it will remain in its original contributed form as a permanent record. Filled"Receiving Disks"are placed into our permanent archives after all of the programs on that disk have been processed. One donated program at a time is loaded from the "Receiving Disk" onto a "Working Disk" and all subsequent versions of that program will be stored on the same disk until the program is finished and ready to be transferred onto the "Dissemination Disk." We have approximately 40 working disks, each with only one program, being evaluated at any given time. At least two educators will review the program on the "Working Disk" and make needed revisions. When they agree that it is finished the program will be removed from the "Working Disk" and added to the current "Dissemination Disk" in the SOFTSWAP. Another program from the "Receiving Disk" can then be loaded onto that "Working Disk" and the evaluation process will be repeated. All finished programs on the "Dissemination Disks" are available for copying by visitors to the Center.

We have two forms to aid in the evaluation of programs: CHECKLIST FOR MICROCOMPUTER PROGRAM REVISION (salmon) and PROGRAMMER REVISION SHEET (Yellow).* These forms list common errors and problem areas which the evaluators are to check. Detailed notes about needed revisions are made on the yellow form and the final reviewer checks to see that all requested corrections have been made. The finished program is described on a final INVENTORY FORM - SOFTSWAP (white) and then added to the SOFTSWAP catalog. Newly developed programs are also listed periodically in the CUE NEWSLETTER.

*forms available from the author at the San Mateo County Office of Education, 333 Main St., Redwood City, California 94063

EVALUATION OF SOFTWARE

The evaluation forms developed for use in the Microcomputer Center are not designed to produce critical reviews for publication. Our primary interest is in cleaning up a program, being sure that it runs well, eliminating spelling errors, factual errors, etc. The actual quality of the programs in the collection varies greatly, as does program length. Each disk contains from 12 to 30 programs, all for one system, but for various subjects and grade levels.

Each program is checked for accuracy of content, clear instructions, trapping of input errors, etc. Certain problems which frequently appear in contributed software could be reduced or eliminated if donors would ask themselves the following questions:

1) Does the program run with relatively few problems? (Unfortunately, we receive many programs which do not load/run at all.)

2) Does the program trap input errors? Does it crash if the user inputs numeric response when the computer is expecting alpha, or vice versa? What happens if the user hits an unwanted ENTER/RETURN? When there is an input error, is the computer response clear and simple? "Input error, redo from start" is not helpful to the novice.

3) Are all words spelled correctly?

4) Are the instructions and other information easy to read on the screen? It is best to avoid crowding and to clear the screen at appropriate intervals. Instructions should be written at a reading level appropriate for the intended user.

5) Is the POSITIVE reinforcement for correct responses more interesting than the negative reinforcement for errors? Graphics in most HANGMAN games, for example, are usually much more exciting when the user loses and is hanged. Students will often deliberately miss a problem or word in order to see a rocket explode, a boat sink, etc. Try to provide strong encouragement for doing the task correctly and yet avoid over-praising.

6) Have you included REM statements as needed? They make it easier to use a program effectively. It is especially helpful to include statements telling the teacher how to modify word lists, problems or other entries.

7) Do you make negative remarks to or about the student? Sarcastic statements can be discouraging. We remove words like "Boy was that dumb," "Stupid," "Dummy," etc.

APPENDIX IX

PRECIS

This appendix contains information about four organizations currently using PRECIS indexing method:

1. ONTERIS
2. YORK COUNTY BOARD OF EDUCATION
3. FORMAT
4. CONTROL DATA CORPORATION (producers of PLATO Systems.

USER: ONTERIS (Ontario Educational Resources Information Service)

USE: Indexing of educational support documents including curriculum guidelines, research documents, and documents relating to commissions, reviews and special projects. Products include microfiche, a printed catalogue and an on-line database.

CONTACT: Majorie Mercer
Coordinator
Information Centre
Research Branch
Ministries of Education, Colleges, and Universities
Queen's Park
Toronto, Ontario
M7A 1L2

(416) 965-4110

ONTERIS uses the PRECIS subject index in the production of its printed index to educational support documents. However, it should be noted that two types of subject analysis are performed on each document: a PRECIS subject analysis and an ISIS (Integrated Set of Information Systems) slashing of keywords. Whereas the former is used in the production of the print index, the latter is responsible for the accommodation of on-line retrieval techniques. ONTERIS has much to contribute in terms of database management experience and its rationale in this regard merits close consideration and further study.

In addition, ONTERIS represents a prominent Canadian example of on organization which has had to

catalogue a large body of previously untreated, uncatalogued material. The following information outlines ONTERIS procedures for processing documents and gives some examples of various records.

What is ONTERIS?

- a computerized online storage and retrieval system
- an answer to the need for efficient sharing of information in the field of education
- a potential repository for all types of educational material
- an umbrella for 3 bibliographic databases

CURRICULUM GUIDELINES AND SUPPORT DOCUMENTS

A database of over 3200 records of Ministry of Education guidelines and support documents, and material from the school boards throughout the Province.

EDUCATION RESEARCH

A database of over 1900 records of research documents from school boards, the Ministry of Education, the Ministry of Colleges and Universities, the Ontario Institute for Studies in Education, the Ontario Educational Communications Authority, and the Ontario Educational Research Council.

COMMISSIONS AND PROJECTS

A database containing records of material related to commissions, reviews, and special projects funded by the Ministries of Education and Colleges and Universities, such as the Commission on Declining School Enrolments (CODE), with 366 briefs and working papers, the Secondary Education Review Project (SERP), with over 2700 records, and the Commission to Review the Collective Negotiation Process between Teachers and School Boards (the Matthews Commission), with 135 records.

For further information on ONTERIS:

Marjorie Mercer - Co-ordinator 965 4110

For further information on the Information Centre:

Carol Fordyce - Manager 965 4581

TO REQUEST A SEARCH:

Ilze Cockburn - Subject Analyst 965 4110

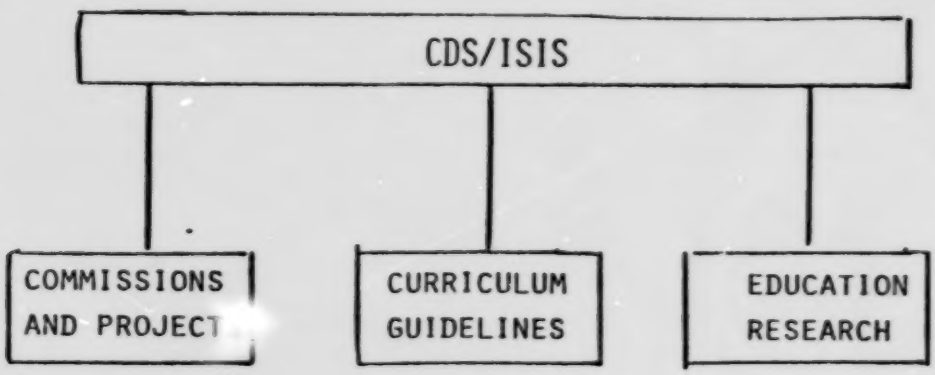
COMPUTER ENVIRONMENT

1. OPERATING SYSTEM: IBM 370/3033
   QUEEN'S PARK COMPUTING BRANCH (QPCB)

2. ENVIRONMENTAL SYSTEM:
   C.I.C.S. (QPCB)

3. SOFTWARE FOR ONTERIS:
   CDS/ISIS

ONTERIS DATABASES

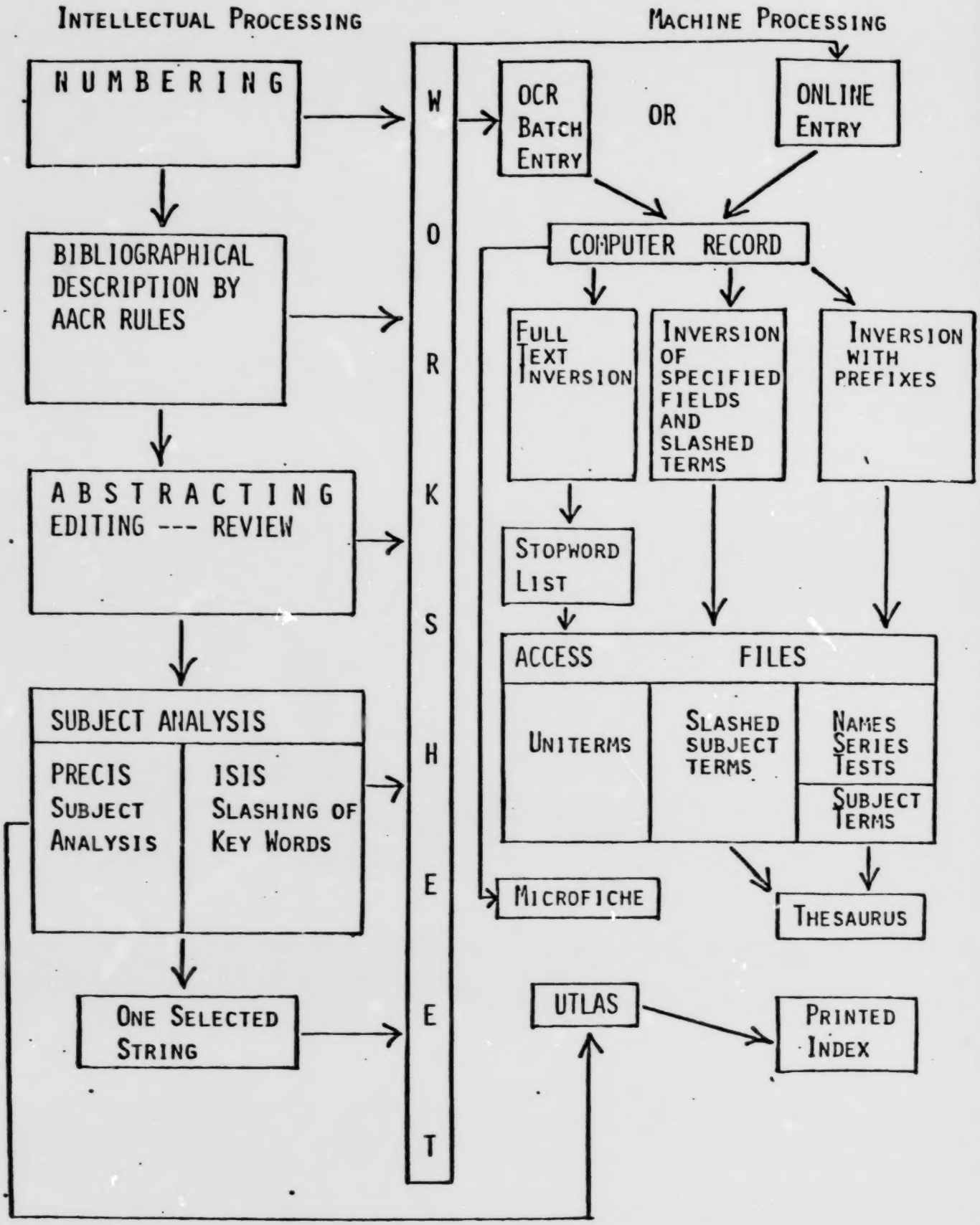


CICS - CUSTOMER INFORMATION COMPUTER SERVICES

CDS - COMPUTERIZED DOCUMENTATION SYSTEM

ISIS - INTEGRATED SET OF INFORMATION SYSTEMS

PROCESSING FOR BIBLIOGRAPHICAL RECORDS



ONTERIS COLLECTION

EDUCATION RESEARCH

In Progress Records	19
New Records	137
Full Records (Ministry of Education, Ministry of Colleges and Universities, school boards, Ontario Educational Communications Authority, Ontario Educational Research Council, and Ontario Institute for Studies in Education)	1971
TOTAL	2127

COMMISSIONS AND PROJECTS

Commission on Declining School Enrolments	366
Commission to Review the Collective Negotiation Process between Teachers and School Boards	135
Secondary Education Review Project	2821
TOTAL	3322

CURRICULUM GUIDELINES AND SUPPORT DOCUMENTS

Ministry In Progress Records	102
New Records (Ministry & school boards)	852
Full Records (Ministry & school boards)	2365
TOTAL	3319

A CURRICULUM DATABASE RECORD

CD02679 —— (1)

(2) ——MATERIAL TYPE: Guideline
(3) ——MATERIAL STATUS: Current
(4) ——LANGUAGE OF DOCUMENT: English
(5) ——CORPORATE AUTHOR: Ontario Ministry of Education
(6) ——BRANCH RESPONSIBLE: Special Education Branch
(7) ——TITLE: Education for Students Who are Homebound, Hospitalized, or in a Residential Treatment Centre.
(8) ——PLACE: Toronto
(9) ——PUBLISHED: 1980
(10) ——PAGINATION: 19 p.
(11) ——CURRICULUM SUBJECT: Special Education
(12) ——DIVISION: Primary Division; Junior Division; Intermediate Division; Senior Division
(13) ——TARGET POPULATION: Handicapped students; Homebound students

(14) ——— CONTENT

Guidelines for and current trends in the provision of programs and services for students who are homebound, hospitalized, or in residential treatment centres, are presented in 3 sections. In the section on administration, topics treated are: objectives of programs, advantages and disadvantages of programs, responsibilities of a senior official, the supervisor, eligibility of students, referrals for educational programs, termination of instruction, the selection of teachers, the responsibilities of parents involved in home instruction programs, and programs for students with behavioural exceptionalities, severe mental handicaps, or communication exceptionalities. A sample daily program is given.

In a section on the teacher, topics are: teaching in home, hospital or treatment centre programs; do's for teachers; teacher's procedure subsequent to receipt of a referral for home or hospital instruction; the initial home visit prior to instruction; the initial lesson; the hospital or treatment centre setting; participation in multidisciplinary team conferences; time for instruction; and teachers' records. Differences between the classroom and home visiting teachers are charted.

b2 In a section on programming, topics are: types of programs (short-term, long-term, programs for students with a terminal illness), with objectives, procedures, and some curriculum and teaching suggestions; instructional aids; and the student.

(15) ——NOTES: 1. CD02680: French version, Programmes d'enseignment pour les élèves retenus a la maison, a l'hôpital, ou en institution
2. Revision in progress: CD03116

EXPLANATION OF A CURRICULUM DATABASE RECORD

1. CURRICULUM DOCUMENT OR CD NUMBER: A unique identifying number is given to each document.
2. MATERIAL TYPE: A description of the type of document is given by using the appropriate term from: guideline, handbook; bibliography; resource document.
3. MATERIAL STATUS: This is included as a means of differentiating between material currently in force and that which has been superseded. When the document is superseded, the CD number of the current edition is given in the Notes section.
4. LANGUAGE OF DOCUMENT
5. PERSONAL OR CORPORATE AUTHOR: For machine searching purposes, one version of the name is used consistently. If there are both a personal and a corporate author, the personal author precedes the corporate author.
6. BRANCH RESPONSIBLE: For ministry curriculum documents, the issuing branch is identified, as are, if included in the document, the name(s) of the compiler(s).
7. TITLE: This is given as it appears on the title page or, in the absence of a title page, the cover.
8. PLACE OF PUBLICATION
9. DATE OF PUBLICATION: If no date is available, the date of the receipt of the document at ONTERIS is given.
10. PAGINATION
11. CURRICULUM SUBJECT: A standardized list of curriculum subjects based on Ministry of Education subject areas is used.
12. DIVISION: The grade and division is entered as indicated on the document, e.g., Intermediate Division or Grade 3 or Year One. In order to provide access to all divisions covered by a document, a wide grade range such as kindergarten - grade 13 would be entered as follows: Primary Division; Junior Division; Intermediate Division; Senior Division. Levels of instruction, such as modified, basic, general, and advanced in grades 9-13, are indicated if they are specified in the document.
13. TARGET POPULATION: When a document has been prepared for use with or by a special group (e.g., exceptional students, adults, etc.) that group is indicated.
14. CONTENT: More detailed and flexible than an indicative abstract, this field provides a description of the contents of a document, reflecting its specificity.
15. NOTES: Related records, French versions, and other bibliographic notes are given to link documents.

RESULTS OF SEARCHES ON THE RESEARCH AND CURRICULUM DATABASES

Request: Material dealing with human relations and sex education in elementary education

SEARCH RESULTS

Research Documents Retrieved - 1

PROCESSED REPORT ON01461
Pond-Brevik, Margaret.
-- Family Life-Sex Education Programming : A Study of Students' Needs.
-- Aurora, Ont. : /York County Board/ of Education, Division of Planning and Development, Research Office, 1978. -- ix, 105 p.

SUBJECT
/STUDENTS/. /Elementary schools/ and /secondary schools/ /Attitudes/ to /family life education/ and /sex education/ /programs/
/Educational needs/ in family life and sex education -- Study regions: /York County/

Curriculum Documents Retrieved - 40

Sample records

CD01843
MATERIAL TYPE: Bibliography; Resource Document
LANGUAGE OF DOCUMENT: English
CORPORATE AUTHOR: Toronto Board of Education
TITLE: Resources Related to Personal and Social Aspects of Guidance Programs
PLACE: Toronto
PUBLISHER: Toronto Board of Education, Guidance and Counselling Services
PUBLISHED: 1970
PAGINATION: 17 p.
CURRICULUM SUBJECT: Guidance
DIVISION: Primary Division; Junior Division; Intermediate Division; Senior Division - K-Grade 13

CD01150
MATERIAL TYPE: Guideline
MATERIAL STATUS: Current
LANGUAGE OF DOCUMENT: English
CORPORATE AUTHOR: Ontario Ministry of Education
TITLE: Guidance : Curriculum Guideline for the Intermediate Division.
PLACE: Toronto
PUBLISHED: 1978
PAGINATION: 46 p.
CURRICULUM SUBJECT: Guidance
DIVISION: Intermediate Division

USER: York County Board of Education

USE: Indexing of print and non-print materials for Aurora High School and four elementary schools in the production of COM

CONTACT: Brian Burnham
Chief Research Officer
York County Board of Education
60 Wellington St. W.
Aurora, Ontario

(416) 727-3141

OR

Audrey Taylor
Librarian
Aurora High School
Aurora, Ontario

(416) 883-3070

The application of PRECIS in York County represents an example of PRECIS appropriateness to off-line or print catalogues. The following information provides an excellent summary of problems relating to design and production of school libarary catalogues, as well as a discussion of the implications of MARC (machine-readable cataloguing), COM (Computer Output Microform), and PRECIS in the search for a solution to these problems.

A COMPUTERIZED LEARNING SUPPORT SYSTEM FOR ONTARIO

Simultext of an audiovisual presentation by
Audrey Taylor, Librarian, Aurora High School
Brian Burnham, Chief Research Officer
The York County Board of Education

to The 23rd Annual Conference of the
ONTARIO EDUCATIONAL RESEARCH COUNCIL

Toronto, Canada, December 4, 1981

1.0 Introduction

This is a report of a developmental research project to investigate means of improving the quality of service in Ontario school resource centres. Users of these centres and other educational libraries need better tools for accessing information. Problems relating to the design of library catalogues and their effectiveness as curriculum support tools have been the main if not sole concern of the project.

1.1 The first part of this morning's presentation is a summary of these problems followed by a summary of what has been accomplished toward solving these problems by means of a working model of a school library cataloguing network. The network has three salient features: (1) use of a national computerized cataloguing network; (2) computer-produced microfiche library catalogues and other products; (3) use of PRECIS, a new computer-assisted indexing system to produce the subject section of the library catalogue. The final part of this section points out what else must be done before the prototype network now operating in York County Board schools can be applied provincially in a cost-effective manner.

2.0 Problems facing school library staff and users

Once established, stocked and staffed, school resource centres provide materials for curriculum support and also for the personal growth of students and professional development of staff. However, many librarians and other educators believe that school library resources are seriously underused. Observational studies give credence to this belief. Some underuse appears to be due to various inadequacies in the library catalogue, which should help those seeking materials, but more commonly frustrates them.

Problems inherent in a school library catalogue relate to how it is produced, its physical format (almost invariably a card catalogue), and the traditional subject indexing systems.

2.1 Production problems

Normally, the resource centre catalogue is either produced by the school librarian or purchased from commercial sources or a mix of both.

In the first mode, the teacher-librarian performs the necessary intellectual tasks -- examining each acquisition, consulting the cataloguing reference tools, and drafting the cards. This is followed by labor - intensive clerical tasks, such as the typing and filing of the cards by the librarian or assistant (if one is employed) or often by a student or parent volunteer. Similarly, time and energy are consumed to generate labels for book spines, circulation cards, etc.

Catalogue card sets are also available from commercial vendors. Providing that funds are available, the librarian can purchase most of the cards, correct or add supplementary data, and then direct the filing of the cards and so on. The subject index cards so supplied present problems since they use standard subject headings lists not designed with the school library user in mind, and do not include the "See" and "See also" references. This problem will be re-examined later.

In addition to the visible costs of card sets, there are invisible cost factors associated with having the teacher-librarian perform technical and clerical tasks. Such tasks take time away from professional work with students and staff.

In some instances, a librarian is appointed well in advance of the opening of a new school (a year in the case of a secondary school). Much of this time is spent cataloguing; alternatively, money is spent for commercial products. Even then an adequate catalogue may not exist when the school opens. (The authors of this report experienced an instance where a high school library was closed all the school's first year while cataloguing was being completed.) With a school librarian's salary today running up to or even beyond $35,000 a year, this is an inefficient as well as ineffective use of time and money.

Cataloguing production costs have to be incurred. But, for each item, the intellectual work of cataloguing needs be performed only once and the results stored in a computerized data base. These bibliographic records can then be shared. Also, this data base can be used to produce, by automated means, catalogues and other technical products. In spite of the availability of systems to do these tasks, efforts and costs are still being replicated in virtually every school library or central processing facility. Finally, despite the labor and money expended on technical chores -- and the misuse of the professional teacher-librarian at a technical level -- the resultant card catalogue is still largely an unsatisfactory product.[1]

2.2 Physical format problems

School libraries almost invariably use card catalogues. The physical format of the card, housed as it is in catalogue drawers, leads to a number of unsatisfactory conditions both for library staff and users.

For the teacher-librarian, the sorting and filing of cards involves much time. Hence these tasks are often left to untrained volunteers who, through lack of knowledge of filing rules and human fallibility, commit errors which detract from the catalogue's usefulness. Similarly, the card catalogue is seldom up-to-date. The cards relating to lost or withdrawn materials are seldom removed from the catalogue because this requires time and effort. It is also very time-consuming and hence costly to retrieve cards and to revise them in order to update terminology. For example, when a nation takes a new name (Zimbabwe for Rhodesia), or a new term replaces an old one (Inuit for Eskimo), the terminology is seldom revised in school library card catalogues.

The student user encounters problems with the physical format of the card. Only one card can be consulted at a time. In addition, (as students say) "you need long nails" to persevere in a card

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[1] A few Canadian school boards have centralized cataloguing and technical services and are now automating. This may reduce but not eliminate some of the problems noted. The teacher-librarian is spared certain chores when they are handled centrally. However, these few systems still face the problem of "subject access" since their data base still uses the same inadequate standard list of subject headings.

catalogue search. If others are waiting for a card drawer because there is only one card catalogue, some users may terminate their search prematurely. Other users, after consulting only one or two cards, incorrectly assume that all related materials will be found at the same location on the shelves as given on the first card(s). This is not so. School libraries normally use the Dewey Decimal Classification system which, like any classification scheme, distributes related materials to different locations. Hence the user may overlook pertinent materials.

As a school library user, the teacher also faces problems. First, the teacher may find it very arduous (if not impossible) to use the card catalogue to identify all that is available to support program units in any given subject area. Part of the problem is in scanning card-by-card. Part of the problem is the need to repeat the process through each subject section which might yield leads. Hence a teacher may make a cursory check of the cards or scan the shelves or merely hope for the best when suggesting that students may find needed support materials in the library. Or the teacher may ask the librarian to prepare a bibliography for teacher and student reference or "to pull all materials" on the topic and sigh with relief, now that the problem has been shunted to someone else.

There is normally only one card catalogue for each library. This may present a minor problem to users who must go to that catalogue (when the library is open) and perhaps wait. There is an even greater difficulty in knowing what materials are in other libraries, since card catalogues cannot be exchanged or union catalogues easily compiled. This inhibits the sharing of collections which is highly desirable especially when money is scarce. Building sharable, specialized collections of (for example) expensive reference books or audiovisual materials is also deterred under these circumstances.

As a physical facility, the card format and the cabinet may also be a problem for the library. As the collection grows, so does the size of the catalogue. In time, more card cabinets must be bought and these compete with materials for floor space. This could become a problem wherever there is no expansion possibility for the library.

2.3 Subject indexing problems

One problem that the teacher-as-library-user faces stems from difficulties in determining the subject content of the resource centre's holdings. In order to make a useful recommendation for additions to the library collection (to ensure that it holds materials to support the ever-changing curriculum), the teacher ought to be able to discover quickly and easily which subject areas are well covered and which areas require additional materials. But that is out of the question since the conventional subject index distributes related materials among unrelated subject-entry terms.

The teacher-librarian is also concerned with collection building and depends on several sources when deciding what to add -- users' requests, book reviews, and personal knowledge of the collection and of curriculum requirements. The librarian cannot rely on the card catalogue as a tool for spotting weaknesses in the collection, not just because of the time required or of the physical difficulty, but because the catalogue has inadequate subject information. (Librarians will understand that the same is true of their "Shelf List" cards.)

Thus, while a catalogue's subject index ought to be useful in discovering what materials are available to support any curriculum area, the subject index section is very inadequate for the needs of school library staff and users. Subject indexing traditionally uses either the printed list of Library of Congress Subject Headings (not designed for school libraries) or "Sears" (a variant of the Library of Congress system). Neither version is satisfactory for school use for the following reasons:

a) lack of current terminology and no feasible way to up-date between revisions of the lists;

b) lack of specificity and exhaustivity in the subject entries;

c) lack of suitable terminology (terms are not intentionally curriculum-related);

d) many subject headings use "inverted" word order and form divisions;

e) lack of sufficient "access" points (each subject heading provides only one point of entry into the subject catalogue: with rare exception, up to three subject headings may be assigned to one title);

f) lack of reference structure (the "See" and "See also" aids) when, for example, cards are bought from commercial suppliers or when teacher-librarians are too busy to make such structures.[2]

2.4 Summary

So unsatisfactory is the card catalogue that school library users commonly by-pass it and go directly to the teacher-librarian who is commonly expected to be a walking, talking catalogue. Alternatively, the librarian is seen as someone with the magic skill and endurance to search through the catalogue for the user. Librarians know that this is a wasteful, ineffective, and frustating use of their talents and time and inhibits the growth of students' independent learning skills.

3.0 Technology which addresses itself to these problems

For over a decade, three computerized systems have existed which can help solve the problems noted above. These systems are the three features of the model school library network mentioned in the opening paragraph of this report.

The first computer system, called MARC (Machine-readable Cataloguing), is the heart of national computerized cataloguing networks and can eliminate repetitious cataloguing. This system provides a computerized data base whereby a network of users can share a pool of cataloguing information. The intellectual work done by one is available to all. Once the cataloguing information is in the computer, catalogues and technical products (e.g., spine labels) can be produced electronically in the format appropriate to the library.

The second system, called COM (Computer Output Microform), provides an alternative to the card catalogue format. This system displays cataloguing information covering dozens of items on one easy-to-scan "page". These "pages" can be produced on microfilm or microfiche. The latter suits schools as it is easy to use and cheap. At a 42 reduction factor, each 4" x 6" microfiche (more commonly called "fiche") can hold more than 200 normal 8 1/2" x 11" pages; thus fiche catalogues consume relatively little space. The author catalogue for a collection of 8,500 titles could fit on

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[2] Commercially-produced sets of reference cards are now available. Also, Library of Congress Subject Headings are being automated and include reference authorities. How adequately these solve some of the school library's problems is not yet demonstrated.

one fiche (see the Aurora High School author catalogue, appended). Copies of fiche catalogues are inexpensive and as many can be produced as circumstances dictate.

A third computerized system, called PRECIS (PREserved Context Index System), is a subject indexing method which overcomes most of the problems in locating needed information. The PRECIS method ensures that:

a) terminology is current, and previously used terms can be easily updated;

b) subject entries are specific and can be exhaustive;

c) terminology is derived from the materials not printed lists, and is therefore curriculum-related when drawn from school library materials;

d) subject entries are in "natural" word order;

e) as many "access" points as are called for by the materials and the curriculum can be generated by this indexing system (each PRECIS "string" provides a number of points of entry; multiple strings can be assigned to one title);

f) a reference structure is an integral part of the system.

These systems are, as noted, computerized, but it is not the intention to describe now how the computers and their software work.

4.0 The Aurora PRECIS Project's results

4.1 1972-75

Between 1972 and 1975, Audrey Taylor, librarian at Aurora High School, demonstrated that a PRECIS subject index (at that time prepared manually and produced in card format) significantly improved the finding of wanted materials and won the ready acceptance of users.

Funds were sought to use a computer for the PRECIS indexing, as its British designers had intended, and to utilize the MARC system to reduce other cataloguing tasks. By using both systems, catalogues could be produced in non-card formats, i.e., book or microfiche (COM). Both the PRECIS computer program and the MARC records were already resident at the University of Toronto Library

Automation Systems (UTLAS). Thus, through UTLAS, book or COM catalogues could be computer-produced. At that time, it looked as if all that was needed was professional and technical support staff and a computer terminal.

4.2 1976-78

In 1976-78, the Ministry of Education funded the first two-year stage of the project to develop, for Aurora High School, a COM microfiche catalogue, enhanced by PRECIS, using MARC records.

By 1978, it was clear that the three systems did resolve most of the traditional problems and produce a superior product capable of very much more than the card catalogue. For instance, cataloguing information was found in the computer data base at UTLAS for about 90% of books and 50% of non-print materials for Aurora High School; minor editing of some cataloguing data is required.

The easy-to-scan microfiche catalogues were readily accepted by Aurora High school students, who found that the PRECIS subject index catalogue gave them a much clearer picture of the resources available to them. Moreover, they could now see at a glance the different shelf locations of materials relevant to their search.

In addition, through using the PRECIS subject index's "See" and "See also" structures, some students began to comprehend the hierarchical structure of phenomena -- how comprehensive entities are related to their more specific parts. As well the one-to-one relationship of terms, unique to PRECIS subject indexing, facilitates effective searching because the user can readily see how to expand or narrow the scope of his search.

Some teachers began to use the catalogue in planning their course assignments. From the beginning it was expected that microfiche catalogues and readers would find their way into the school staffroom and into department offices. If good portable readers could be found, there was no reason why the fiche couldn't go home with the teacher who wanted to do program planning there. (In fact, when the fiche catalogues were first regularly used outside the Aurora High School library, it was in the school's technical wing. The automotive teacher reported that not only did his students use the catalogue, but other students also dropped by to browse.)

However, at the end of 1978, there were still technical problems and intellectual challenges: (1) the PRECIS computer program needed updating and upgrading; (2) spine labels and other technical products were still "primitive"; (3) cataloguing of complex non-print materials was time-consuming; (4) the indexing of literature, particularly novels, needed rethinking. There was also the challenge of determining whether the indexing method used for secondary school materials could be successfully applied to elementary school library collections.

To respond to these challenges, the Ministry of Education and the York County Board jointly funded work in 1979 and 1980.

4.3 1979-80

As this stage of development draws to a close, the successes and shortfalls can be reckoned and future activities specified. A mini-network including Aurora High School and six elementary schools has come into being and is generally functioning well.

4.3.1 The list of successes include:

(a) the computerized cataloguing network is providing cataloguing information for over 90% of book materials for both elementary and secondary schools; (the percentage is even higher for materials published in North America) which means that, since original cataloguing is required for only one book in ten and that since only minor editing is needed for the remainder, there is a great saving in terms of intellectual effort and time;

(b) the computerized cataloguing network is providing cataloguing information for only 50% of non-print materials for both secondary and elementary schools but, since cataloging such materials is especially difficult and time-consuming -- so much so that it often is not even done -- this represents a very substantial benefit;

(c) not only does the original cataloguing done exclusively by the Aurora PRECIS Project staff meet the needs of all five schools presently in the York County mini-network, but statistics provided by UTLAS show that other users of the national cataloguing network, with whom we have a sharing agreement, are using the MARC format records produced by the Aurora project;

(d) Aurora High School and four elementary schools have received COM catalogues, and in all instances these have been well received, being easy to scan and making it possible to "browse" the catalogue instead of the shelves; (in November 1980, all five mini-network schools had updated or initial microfiche catalogues);

(e) the microfiche catalogues have been produced in multiple copies (at per catalogue costs as low as $1.00 to $2.00 for the entire catalogue of a small collection) so that any reasonable number of students and teachers can use this searching tool simultaneously and at locations other than the library (e.g., in departmental offices, home, staff room); these easily portable fiche have also been shared among the local mini-network members to facilitate interlibrary loan and collection-building;

(f) the computer-generated catalogue has freed the librarian from sorting and filing of cards and catalogue maintenance;

(g) for the four schools which have now had updated fiche catalogues, revision of terminology and correction of errors have been easily accomplished, because of the power of the computer;

(h) in the libraries of Aurora High School and the new elementary schools there are no space-consuming card cabinets; a microfiche reader and the fiche catalogues can be easily situated wherever there is a 30" by 30" flat surface;

(i) the PRECIS subject index has made it remarkably easier for users to discover what materials are available on a topic because of the following advantages of the PRECIS system: specificity and exhaustivity of the subject entries; curriculum orientation and currency of terminology; and, because of the special one-stage format of the catalogue designed by the PRECIS Project, all materials on a given subject are pulled together for easy scanning;

(j) the PRECIS subject index method has been used with print and non-print materials representing all major curriculum areas and there are now over 18,000 titles, well over 20,000 PRECIS "strings" and about 15,000 reference terms in the PRECIS Project file in the UTLAS data base and thus available for use not only by York County schools but also by authorized network participants across the country.

4.3.2 The problems encountered and as yet unresolved lie in these areas:

(a) work flow and materials management in a centralized technical services facility;

(b) time required in the elementary schools for the physical processing of the materials (e.g., sorting computer products, putting on labels, book cards and pockets, plastic jackets, etc.);

(c) inadequacies of some computer-generated products, e.g., labels;

(d) inadequacies of the MARC format for audiovisual materials:

(e) slow acceptance of the microfiche catalogues by teaching staff;

(f) lack of a sufficiently large file of bibliographic records enhanced by PRECIS to respond to requests of existing school libraries to join the mini-network;

(g) inability of the original PRECIS software to accomodate easily new users (other school boards, etc.);

(h) cost (staff, computer time, etc.) and acceptance by other school boards of need to automate and centralize school library technical services in order to move the project from an experimental working model of a cataloguing/information retrieval network to a production mode involving many more than seven schools in one Board's jurisdiction.

5.0 The resolution of these problems lies in these directions:

(a) re-evalute work flow and materials management, including need for more staff and hardware;

(b) address the needs of the elementary school librarians by studying the effect of providing an itinerant school aide;

(c) continue assessment and recommendations for change to UTLAS for some of the technical products;

(d) make recommendation for changes and additions in the MARC format for audiovisual materials;

(e) devise a training program for teachers which will help them to recognize the strengths of the microfiche catalogues and the needs of students, particularly in basic research skills;

(f) explore means of rapidly increasing the size of the bibliographic files enhanced by PRECIS, and so expand the central file of PRECIS data available to school users;

(g) expedite the implementation of a new PRECIS/CATSS software program;

(h) encourage librarians and school administrators to understand the implications of networking and the need for automated centralized technical services for school librarians.

Work is proceeding on these matters.

6.0 CURRENT

6.1 The project has some new undertakings. These represent both additions to the network and also new dimensions to the developmental research.

6.1.1 Three network schools' libraries have learning materials acquired either before the school joined the project or inherited from now closed non-network schools. A "retrospective conversion" process began in 1980 and, at present, these schools are developing a policy for weeding these materials. Project staff will develop "retrocon" routines suited to the weeding philosophy which emerges.

6.1.2 In September 1981 The York County Board of Education opened one "French Immersion school" and "French Immersion wings" in three other elementary schools. Their library collections are being processed by this project. French language learning materials held in other network schools are already being catalogued and PRECIS-indexed. However, there are different intellectual problems to be addressed when the program orientation is so dramatically different as is the case with the pupils who begin immersion in a second language in grade 1.

6.1.3 Elementary schools are still being added to the network. Two new schools constructed by The Y.C.B.E. were added this year. One new school is scheduled for 1982. In addition, the project is adding one school which has a new library addition and a substantial increase in its holdings. Building the secondary school data base needs attention by 1983.

6.2 As experience is gained with these undertakings, project staff learn the ins and outs of networking with clients having different situations and needs. As the project moves up its learning curve it draws ever closer to the time when an interboard network is viable. Provincial and national networks of school and public

libraries should be feasible once the challenges of working across jurisdictions are overcome. Thereafter, networking with special libraries or other institutions in the public and private sector should be possible. The questions today are of the nature: "Who is ready to join us . . . and when do we start?" You, out there, can provide the answers.

USER: FORMAT
National Computerized Audiovisual Information System (National Film Board)

USE: Indexing of NFB films for print catalogue, COM, and an on-line database

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The National Film Board makes use of the PRECIS software resident at UTLAS, for production of its print products and manipulation of the PRECIS string and uses its own developed software to provide on-line searching of the PRECIS string. FORMAT represents an example of a PRECIS application which accommodates on-line information retrieval, as well as the production of a print catalogue. Refer to the attached National Film Board literature for history, accomplishments and intentions of FORMAT, as well as the role of PRECIS.

"FORMAT"

NATIONAL COMPUTERIZED AUDIOVISUAL INFORMATION SYSTEM

National Film Board of Canada
Distribution Branch
Montreal, Quebec
May 1, 1982

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INTRODUCTION

The National Film Board's involvement in the development of an automated information system for Canadian audio-visual materials is one of several wide-ranging initiatives concerned with improving the accessibility of these productions for users in the Canadian marketplace. Such initiatives have brought about for example a major restructuring of NFB library service to allow free film loan, the addition of Canadian Broadcasting Corporation/Radio-Canada programmes and many private sector 16MM films to the NFB's library network, and the introduction of a computerized nationwide booking/control system.

The information-providing initiative goes back to the mid-1970's, when a number of studies were undertaken to investigate the use of non-print media in Canadian educational institutions. The results of these studies, and the subsequent recommendations of a research project undertaken for NFB at Dalhousie University School of Library Service, formed the nucleus, in August 1976, of a much larger Task Force established by the Government Film Commissioner to study film information and distribution throughout Canada. Specifically, the Task Force was charged with the responsibility to design a workable and practical computer based information system which would encourage and facilitate the use of Canadian audio-visual products.

As a result therefore of much research and consultation, FORMAT is now in the early stages of its implementation and operation.

SYSTEM DEFINITION

FORMAT is a comprehensive database of Canadian audio-visual products. It is a computerized system which aims at assisting the Canadiar film industry and community in the selection, acquisition and utilization of these products. Its design ensures the capacity to expand so as to provide for all Canadian-produced audio-visuals as well as stock shots, slides, etc. And, because input is handled according to the international format specifications of machine-readable cataloguing as adopted by the National Library of Canada, the System is compatible with those designed to handle print material and can be expanded to include film literature. The System is bilingual, capable of handling and producing information in both English and French.

This information is available through a variety of printed or COM (Computer Output Microform) catalogues which are produced from the machine-readable files, as well as being available on-line.

The on-line capacity of FORMAT is being implemented in two major ways. First of all, since the data is stored with the University of Toronto Library Automated Systems (UTLAS), all members of the UTLAS network have direct on-line access to the files. This capacity is most useful for public or school libraries which have acquired copies of audio-visual items and wish to incorporate the relevant information in their own catalogues or databases. Secondly, the information is being made available to all users by the placement of a sophisticated on-line inquiry system in NFB's 27

Regional Offices and in its U.S. Office in Chicago. The inquiry system, which will be operational across the country by late summer 1982, permits users to search for specific information by means of sixteen "selection criteria". These include title (a browseable search on any title word), series title (again a browseable search), language, type of AV material, color/b & w, date or date range, subject terms from the description, PRECIS specific subject terms, running time (specific or approximate), producer, and director. The booking/control system already in operation in these NFB Offices will then be integrated with the FORMAT inquiry system, enabling the terminal operator to select a film and book it for the user at the same time. As non-NFB collections are added to the database, production, distribution and availability information will be built up, so that eventually the outcome can be a list of Canadian non-print material complete with location codes and borrowing or sales information. This information can be marketed by means of general or specifically-requested print-outs, or if any Canadian institutions wish to gain access to the database through their own terminals, they will be able to do so by a variety of means.

FORMAT management is the responsibility of the Distribution Branch, Distribution Services Division. The Director of the Division has overall responsibility for the development of the System which includes inside and outside procedures to facilitate the input/output flow of data, negotiation for external services, and establishment of on-going communications with the Canadian film industry/community, Federal/Provincial/Municipal governments, organizations and non-Canadian markets where advantageous. The emphasis and

thrust of the System is that of sharing and co-operation through broad external contacts with the Canadian film industry and community. This exchange of information has already influenced the development of the System, and will subsequently affect the Canadian audio-visual marketplace.

The needs of all potential users have been paramount throughout the design phase of FORMAT. Users have been identified as educators, librarians, media specialists, producers, directors, distributors, classrom teachers, home viewers, and others associated with the film community/industry, both in the public and the private sector. Users have been identified both on a national basis and internationally. As FORMAT is implemented, it is being tested on the basis of these users' needs, and will be re-designed if feedback indicates necessary areas for improvement.

Specific needs at the present time can be summed up as:

1) Listings of Canadian non-print materials
2) Subject and product indexes of Canadian non-print materials
3) Access to information (on-line and batch-mode)
4) Computer software compatibility
5) Publication of specialized catalogues
6) Indications of production trends
7) Dissemination of information on Canadian products
8) A central source for all information on Canadian audio-visual products

DATA GATHERING

The long-term value of the System ultimately depends upon the preparation and calibre of data input. The field of library media-science is complex and at the point of making tremendous breakthroughs, not only in this country, but also throughout the world. The Board has the expertise to carry out the function of information assembly, programme development, and dissemination of hard copy catalogues as well as direct on-line access. Priority will be given to material available nationally, by means of free loan, rental or sale. Material that is less accessible will take a lower priority.

The Preserved Context Index System (PRECIS), a sophisticated subject indexing system expressly designed for computer application and implemented internationally for both print and non-print materials, is being used to provide subject access to the film file. PRECIS is available as a printed subject index in the hard copy catalogues (see appendix A). It is also available on-line for the first time in a North American network as part of the inquiry system. PRECIS terms in on-line FORMAT can either be searched coordinately or in conjunction with other selection criteria.

The film records are stored in CAN/MARC format (Canadian version, machine-readable cataloguing) according to the latest specifications of the National Library of Canada.

In order to generate spin-off capacities and to ensure the use of the database beyond the immediate needs of all users, classification numbers from the Dewey Decimal, Universal Decimal, and Library of Congress classification systems are added to the record stored for each A/V product when these are available from other bibliographic sources.

OUTPUT OF THE SYSTEM

Information retrieval will be available to users in two output modes:

1) in batch-mode for special catalogue requests

   a) computer-generated hard-copy catalogues, both comprehensive and selective

   b) computer-output microform (COM)

   The above can be generated by means of the UTLAS software.

2) on-line

a) through terminals located across Canada in NFB offices (appendix B)

b) through UTLAS (appendix C)

c) available to other organizations in machine readable format

On-line output for all the information components is being made available on a gradual basis as capacities are developed. Phase 2 of the inquiry system is operational now. Phase 3 consists of the addition of the on-line PRECIS searching capability. Linkage of the inquiry system with the booking/control system, enabling chosen films to be stored in memory, searched in terms of regional availability for the dates requested, and then booked with no further key punching, is scheduled for Phase 4. Phases 5 and 6 have to do with Telidon-related projects now under negotiation.

Initially FORMAT on-line will generate data from a base consisting of NFB distributed products (first newly released and current, then retrospective), approximately 1,500 educational filmstrips, and from 800 to 1,000 films available from the Canadian Filmmakers' Distribution Centre (CFMDC) in Toronto. Pilot projects for data inclusion are now underway with the National Film, Television and Sound Archives and the Nova Scotia Public Archives, as well as a film-related printed materials pilot project with NFB's department of Research and Development of Policy. Eventually, the database will include information about all Canadian A/V products.

As FORMAT develops in terms of refined technical capabilities and the growth of the database, the opportunity will exist to de-bug and improve the System step by step.

For a full list of information available to users of FORMAT, see appendix D.

IMPLEMENTATION MODEL

FORMAT is being implemented according to a planned schedule as follows:

a) The collected information provides the material for the creation of the database records. These records will include in order of priority:

i) - newly released NFB films - completed

ii) - current NFB films - completed

iii) - Non-NFB Canadian films - underway

iv) - NFB Audio-Visual productions - completed & being updated

v) - Non-NFB Audio-Visual productions - completed & being updated

vi) - NFB Archival films - data collection in process

vii) - Non-NFB Archival films - pilot projects underway

viii) - NFB Archival Audio-Visual productions - data collection in progress

ix) - Non-NFB Archival Audio-Visual productions.

b) All pertinent information is being collected on an especially designed data gathering sheet (see appendix F), with the exception of information obtained in a format which is already machine-readable.

POLLUTION. Environment
– *Animated films*
Air!
Paradise Lost.

POLLUTION. Freshwater biomes
Control
Freshwater World.

POLLUTION. Great Lakes
The Rise and Fall of the Great Lakes.
Control measures
The Great Clean-up.
The Great Lakes:
Only If You Care.

POLLUTION. Oceans
– *Animated films*
Deep Threat.

POLLUTION. Water resources. Third World
Water – the Hazardous Necessity.

POLYGONS
See also
SQUARES
TRIANGLES

POOR FAMILIES. North America
Social problems
The Things I Cannot Change.

POOR PEOPLE
See also
BEGGARS
POVERTY

POP MUSIC
See also
ROCK MUSIC

POPULAR MUSIC
See also
BALLADS
JAZZ

POPULAR MUSIC
– *Film interpretations – Animated films*
Street Musique.

POPULATION
See also
FAMILY PLANNING
HUMAN SETTLEMENTS
IMMIGRANTS

POPULATION. Urban regions. North America
Absence – *Experimental films*
23 Skidoo.

POPULATION CONTROL. Man
What on Earth Are We Doing?

PORNOGRAPHY
– *Sociological perspectives*
Not a Love Story:
A Film About Pornography.

PORTRAIT PAINTINGS
Canadian portrait paintings. Squires, Gerald
Portrait: Gerald Squires of Newfoundland.

PORTUGUESE SCHOONERS. Newfoundland
Fishing
The White Ship.

POST PARTUM DEPRESSION. New mothers
Post Partum Depression.

POSTAL SERVICES
Mail delivery, ca. *1938*
News for the Navy.†

POSTAL SERVICES. Canada
– *Experimental films*
Mail Early.†
Christmas postal services – *Experimental films*
Mail Early For Christmas.†
Mail delivery – *Animated films*
A Tale of Mail.

POSTAL SERVICES. Great Britain
Mail delivery ca. *1939* – *Experimental films*
Love on the Wing.†

POT *See* **MARIJUANA**

POTATOES. New Brunswick
Farming
Potatoes.

POTTERY
Earthware.
Techniques – *Stories – Children's films*
The Story of Peter and the Potter.

POVERTY
See also
BEGGARS

POVERTY. Point St. Charles. Montréal
The Point.

POVERTY. Population. Third World
Attitudes of governments – *Animated films*
Top Priority.

POWER
See also
POLITICAL POWER

POWER PUMPS
Use in control of forest fires – *Guides*
Fighting Forest Fires with Power Pumps.

POWER STATIONS
See also
NUCLEAR POWER STATIONS

PRAIRIE PROVINCES
See also
ALBERTA
MANITOBA
SASKATCHEWAN

PRAIRIE PROVINCES
Farming, *1930-1939*. Life styles. Childhood memories
Prairie Album.
Wheat. Farming
The Changing Wheat Belt.

PRAIRIE PROVINCES. Special subjects. Kurelek, William. Canadian paintings
Kurelek.

PRAIRIES. North America
Buffalo. Hunting, *ca. 1850*
Age of the Buffalo.

PRE-FABRICATED RESERVOIRS
Construction
Reservoir.

PRECIOUS METALS
See also
GOLD

PRECIPITATION. Weather
See also
SNOWFLAKES

PREGNANCY
See also
CHILDBIRTH
CONTRACEPTION

PREGNANCY
Role of nutrition
You're Eating for Two.

PREGNANCY. Adolescents
– *Stories*
Phoebe.

PREHISTORIC REPTILES
See also
DINOSAURS

PREJUDICE
See also
BIGOTRY
DISCRIMINATION

PREJUDICE
Exposure by children – *Dramatizations*
Teach Me to Dance.

PREMIERS. Québec
Johnson, Daniel – *Biographies*
The Inheritance.
Lévesque, René – *Biographies*
The Champions.

PRESERVATION
See also
CONSERVATION

PRESIDENTS. Chile
Allende Gossens, Salvador. Political views
Salvador Allende Gossens: A Testimony.

PRESS
See also
JOURNALISTS
NEWSPAPERS

PRESS AGENCIES
Multinational press agencies. Monopolies on information on the Third World – *Study examples: Africa*
Distortions.

PRICE CONTROLS
Role in economy during war – *Animated films*
Dollar Dance.†

PRIMARY COLORS
Introduction – *Children's films – Animated films*
The Little Men of Chromagnon.

PRIME MINISTERS. Canada
Diefenbaker, John
"Dief"!
Trudeau, Pierre Elliott. Participation in politics, *to 1977*
The Champions.

PRISON LIFE
Effects on prisoners
Cell 16.

PRISON LIFE. Canada
– *Animated films*
Prison.

PRISONERS. British Columbia
Rehabilitation – *Study examples: Seventh Step Society*
The Seventh Step to Freedom.

PRISONERS OF WAR. Japanese internment camps. World War 2
Canadian prisoners of war – *Personal experiences – Feature films*
A War Story.

PRISONS
See also
CONCENTRATION CAMPS
INTERNMENT CAMPS

PROBLEMS
See also
SOCIAL PROBLEMS

PROCESSIONS
See also
MARCHES

PROCRASTINATION
– *Humorous treatment – Animated films*
Getting Started.

PRODUCTION
See also
INDEPENDENT PRODUCTION

PROFESSIONAL TEAMS. Hockey. Québec Nordiques
Just Another Job.

PROFESSIONAL WRESTLING
Wrestling.

PROGRAMS
See also
EXCHANGE PROGRAMS
TELEVISION PROGRAMS

PROLETARIAT *See* **WORKING CLASS**

PROPORTIONS
– *Animated films*
Dimensions.

PROSPECTORS. Vancouver Island
Life styles
David and Bert.

PROSTHESES *See* **ARTIFICIAL LIMBS**

ENVIRONNEMENT
Voir aussi
ÉCOLOGIE
TERRES

ENVIRONNEMENT
Pollution – *Films d'animation*
Le Bleu perdu.

ENVIRONNEMENT. Canada
Pollution. Attitudes de la société
Une question d'attitudes.

ENVIRONNEMENT. Nord du Québec.
Effets du développement hydro-électrique de la Baie James
Baie James: environnement et écologie.

ENVIRONNEMENT CANADA *Voir* **CANADA.** *Environnement Canada*

ÉPOUSES
Voir aussi
FEMMES À LA MAISON

ÉPOUSES. Prisonniers québécois. Colombie-Britannique
– *Expériences personnelles*
Mur de verre.

ÉQUITATION
Voir aussi
CARROUSEL
CHEVAUX
SELLIERS

ÉRUPTIONS. Kilauea. Volcans. Hawaii
1955, 1959-1960
Éruption au Kilauea, aux îles Hawaii.

ESCALADE DE GLACIER. Pilier de Cristal. Montmorency (*chute*). Québec
Le Pilier de Cristal.

ESCALADE DE ROCHER. Val-David. Laurentides. Québec
Les Rochassiers.

Techniques – *Films éducatifs*
Initiation à l'escalade.

ESCLAVAGE. Noirs. Michigan
1851
Frontière de la liberté.

ESCRIME
Sabre et Fleuret.

ESPACE INTERPLANÉTAIRE
Voir aussi
EXTRA-TERRESTRES
SYSTÈME SOLAIRE
TECHNOLOGIE SPATIALE
UNIVERS

ESPACE INTERPLANÉTAIRE
Recherche scientifique. Utilisation de la spectroscopie
Herzberg.

Voyages – *Films d'animation*
Notre univers.

ESPAGNE
Guerre civile d'Espagne, *1936-1939*. Participation des militaires canadiens
Les « Canadiennes ».

Madrid. Guerre civile d'Espagne, *1936-1939*
Defense of Madrid.

ESPIONS QUÉBÉCOIS
« IXE-13 ». Aventures – *Films de fiction – Comédies*
Ixe-13.

ESPRIT *Voir* **PENSÉE**

ESQUIMAUX *Voir* **INUIT**

ESTOMAC
L'Estomac.

ÉTANGS
Insectes et animaux. Cycles de vie
L'Étang.

ÉTATS *Voir* **GOUVERNEMENTS**

ÉTATS-UNIS
Voir aussi
Les entrées aux noms des différents États
TOURISTES AMÉRICAINS

ÉTATS-UNIS
Féministes américaines – *Témoignages*
Quelques féministes américaines.

Mouvements féministes. Histoire
L'Essor féminin.

Société contemporaine – *Perspectives sociologiques*
Voir Miami.

ÉTÉ. Québec
... Et Dieu créa l'été.
Le Québec au temps des étés.

E.T.G.A. Programmes internationaux. Recherche scientifique. Météorologie
Opération E.T.G.A. Rôle du Canada
Opération E.T.G.A.

ETHNOCIDES. Indiens Otomis. Mexique
Ethnocidio.

ETHNOLOGIE
Voir aussi
GROUPES ETHNIQUES
RACES HUMAINES

ETHNOLOGUES QUÉBÉCOIS
Barbeau, Marius. Points de vue sur la mythologie des Indiens du Canada
Marius Barbeau et l'Art totémique.

Barbeau, Marius. Points de vue sur les arts populaires québécois
Marius Barbeau et le Folklore canadien-français.

ÉTOILES. Formes géométriques
– *Films d'animation – Films expérimentaux*
Étoiles et Bandes.

ÉTRANGERS. Régions rurales. Québec
Peur des étrangers – *Films de fiction*
L'Héritage.

ÊTRES VIVANTS
Voir aussi
ANIMAUX
EMBRYONS
MICRO-ORGANISMES

ÉTUDIANTS
Voir aussi
ÉLÈVES

ÉTUDIANTS
Critiques de l'école
Pour un bout de papier.

Formation pour les carrières dans la Garde côtière canadienne
La Garde côtière canadienne (D'étudiant à commandant).

ÉTUDIANTS. CEGEPS. Québec
– *Témoignages*
« C'est votre plus beau temps ».

ÉTUDIANTS ACADIENS. Écoles secondaires. Nouveau-Brunswick
Une simple journée.

ÉTUDIANTS ACADIENS. Université de Moncton. Moncton. Nouveau-Brunswick
Revendications culturelles et politiques
L'Acadie, l'Acadie.

ÉTUDIANTS QUÉBÉCOIS
Voir aussi
ÉCOLES SECONDAIRES. Québec

ÉTUDIANTS QUÉBÉCOIS. Écoles secondaires
Orientation professionnelle
Un jeu de hasard.

EUROPE
Voir aussi
Les entrées aux noms des différents pays

EUROPE
OTAN. Rôle
Quatre jours en automne.

Renaissance
Jean Cabot, navigateur.

EUROPE DE L'OUEST
Défense par l'OTAN
Borealis.

OTAN. Rôle des Forces armées canadiennes
Sentinelles de l'Occident.

EUTHANASIE
Responsabilités des médecins. Points de vue du sociologue Ziegler, Jean
Avec Jean Ziegler, sociologue.

ÉVANGILES *Voir* **BIBLE.** *Nouveau Testament. Évangiles*

ÉVASION FISCALE. Impôt sur le revenu. Canada
Conséquences – *Films de fiction*
L'Affaire Sloane.

ÉVÊQUES. Église catholique. Montréal
Charbonneau, Joseph – *Biographies*
Joseph Charbonneau: sixième évêque de Montréal.

ÉVOLUTION
Voir aussi
GÉNÉTIQUE
ORIGINES DE LA VIE

ÉVOLUTION
– *Exemples étudiés. Fossiles*
Images des mondes perdus.

ÉVOLUTION. Homme
Le Défi du devenir.

– *Films d'animation*
Évolution.

Apparition des outils
L'Origine de l'homme – Les Outils.

ÉVOLUTION GÉOLOGIQUE. Arctique. Canada
Recherche scientifique
L'Extrême-Nord canadien: le visage du pays.

ÉVOLUTION GÉOLOGIQUE. Canada
Recherche scientifique. Rôle de la Commission géologique du Canada
Le Passé vivant.

ÉVOLUTION GÉOLOGIQUE. Écorce terrestre. Amérique du Nord
Richesses de la terre.

EXAMENS. Écoles secondaires. Québec
56 700 minutes.

EXCURSIONS *Voir* **VOYAGES**

EXERCICES PHYSIQUES
Joie de vivre.

EXETER (*cathédrale*). *Exemples étudiés*
Angleterre. Architecture gothique. Cathédrales
La Cathédrale d'Exeter.

EXILÉS *Voir* **RÉFUGIÉS POLITIQUES**

EXISTENCE
Voir aussi
VIE

EXISTENCE
Aspects éphémères
Le Château de sable.
Clair – obscur.

Étapes – *Films d'animation*
Premiers jours.

Signification
Les Allées de la terre.
L'Homme nouveau.

EXPÉDITIONS
Voir aussi
EXPLORATION

EXPÉDITIONS. Nahanni (*rivière*). Territoires du Nord-Ouest
La Nahanni.

EXPÉDITIONS ARCHÉOLOGIQUES SOUS-MARINES. Terre-Neuve
L'Énigme du Saphir.

EXPÉDITIONS MARITIMES. Arctique. Canada
1969. Brise-glace « John A. Macdonald »
Passage au Nord-Ouest.

1969. Pétroliers « Manhattan »
Passage au Nord-Ouest.

EXPÉDITIONS MÉDICALES CANADIENNES
Recherche scientifique sur la population de l'île de Pâques
Expédition à l'île de Pâques.

EXPÉRIENCE CRÉATRICE *Voir* **CRÉATIVITÉ**

EXPLOITATION MINIÈRE
Voir aussi
INDUSTRIE MINIÈRE
PROSPECTION

EXPLORATEURS
Voir aussi
VOYAGEURS

EXPLORATION
Voir aussi
PROSPECTION

NFB Libraries and Offices in Canada

1 Vancouver
2 Victoria
3 Prince George
4 Winnipeg
5 Calgary
6 Edmonton
7 Regina
8 Saskatoon
9 Toronto
10 Kitchener
11 London
12 Hamilton
13 Kingston
14 North Bay
15 Thunder Bay
16 Ottawa
17 Montréal
18 Chicoutimi
19 Rimouski
20 Sherbrooke
21 Trois-Rivières
22 Québec
23 Halifax, N.S.
24 Sydney, N.S.
25 St. John, N.B.
26 Moncton
27 St. John's, Nfld.
28 Corner Brook, Nfld.
29 Charlottetown, P.E.I.
30 Noranda

UT/LAS Clients in Canada

Appendix C

RECORD CONTENT

FORMAT users will be able to search the database to obtain the following information about each item:

A. A fixed core of information available upon date of release.

		MARC TAG
* 1)	Film Identification Number (NFB films)	035
* 2)	Inputting agency	040
* 3)	Release title	245
* 4)	Series title	440
* 5)	Programme title	711
* 6)	Type of AV material	ff66

* Information fields with an asterisk (*) are "selection criteria" in the on-line system, which means that this information can be accessed directly on-line either on its own as in combination. All of the information listed above can be displayed on the screen, or included in a print-out, once a selection is made.

* 7)	Language of cataloguing (either English or French at present)	ff17
8)	Government production	ff10
9)	Alternate language title, series title	512, 840
* 10)	Producing institution or organization	ff5
11)	Country of production	260$b
12)	Sponsor(s)	260$c
13)	Production dates	ff2,3,4
* 14)	Date of release	260$c, ff2
* 15)	Colour/B&W	ff24
* 16)	Running time	308
17)	Other physical description, eg. number & size of reels; sound; 16 or 35mm	300/500
18)	Technique, eg. animation, live action documentary, fiction, etc.	ff70

19) Credits
* Producer; * Director; Editor; Script; Camera; Music; Narration — 508/700

20) Cast — 511

* 21) Description or abstract — 520

22) Bibliographic history note — 503

* 23) PRECIS indexing — 690/692

B. A second level of information which needs frequent revision to remain up-to-date, is also included:

* 1) Active/Archival status — 090

2) Restricted use notes — 506

3) Citations of reviews — 510

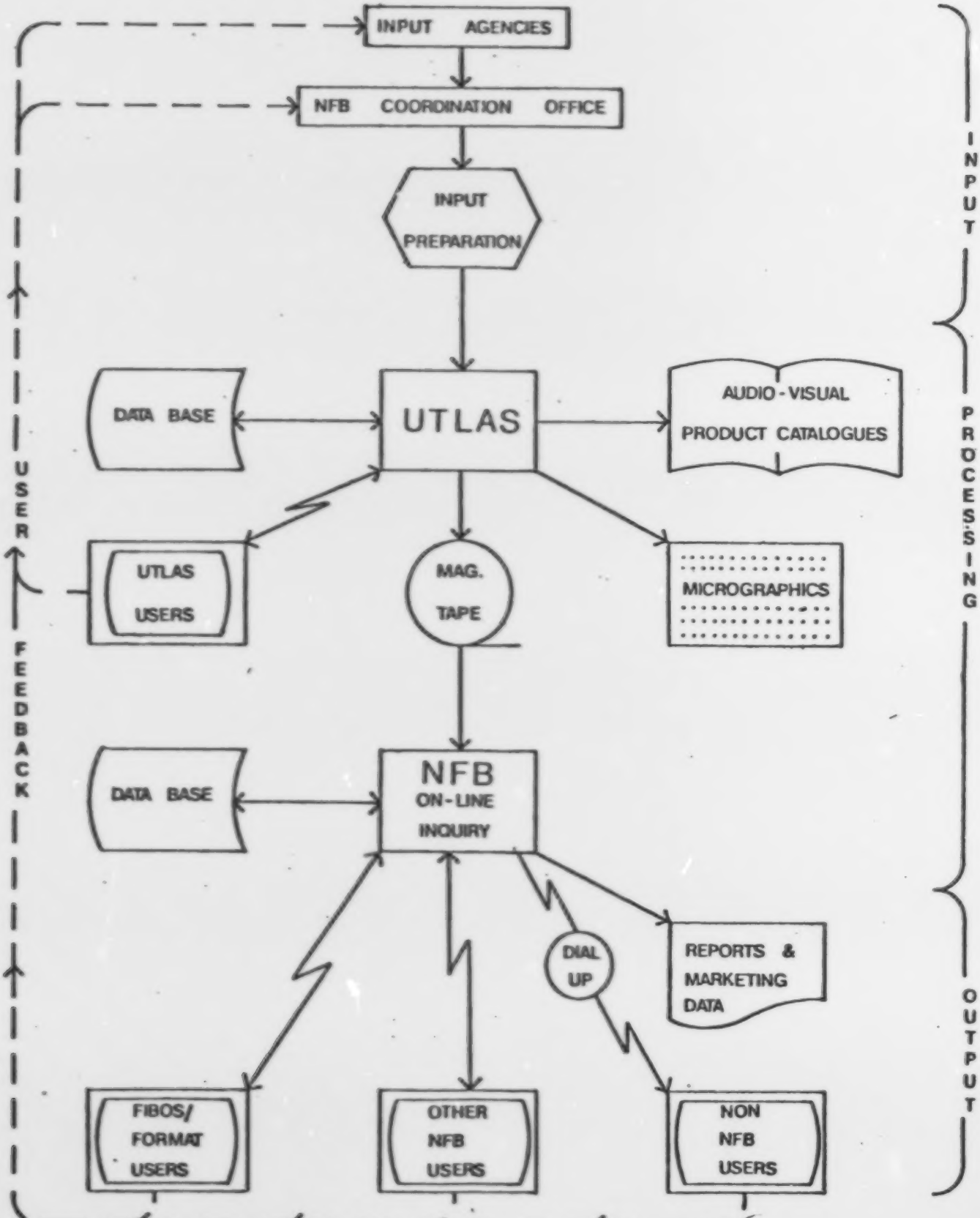
* 4) Awards — at concl. of 520

5) Accompanying materials — 300/500

* 6) Distributors - sales, rental, loan — 265

FORMAT

CANADIAN AUDIO-VISUAL PRODUCTS INFORMATION SYSTEM



USER: Control Data Corporation (producers of PLATO Systems)

USE: Indexing PLATO courseware for the PLATO on-line catalogue

CONTACT: Nancy Vernon
Manager
Published Courseware Delivery
Control Data Corporation
8100 34th Avenue South
Box 0
Minneapolis, Minnesota
55440

(612) 853-3236

PRECIS has been used to index about 1,300 records of educational software. A staff of four indexers processes 50-60 courseware items per year. The head indexer does not have a traditional library background. The resulting database is intended as a marketing tool and is searchable on-line by PLATO users. Cataloguing and indexing are done on-line, eliminating coding of forms and subsequent keypunching. A print catalogue of PLATO materials is also available, but is produced completely independently of the database (reasons were not apparent) and does not employ the PRECIS indexing method. The type of data included in PRECIS strings relates to subject content, instructional mode (game, drill and practice) and a library designation specific to the PLATO organization (academic, curriculum design, etc.)

The following procedure is used by an indexer in the cataloguing and indexing of PLATO courseware:

1. Examine documentation (marketing and support material) of a new piece of courseware
2. Derive bibliographical details (author, titles, etc.)
3. Write abstract
4. List possible PRECIS terms (descriptions of content)
5. Consult on-line catalogue for similar courseware and compare terms generated in 4
6. Consult authority file (available on microfiche produced by British National Library) to verify that selected terms exist in file and to make see and see also reference to synonymous terms (Because of the new nature of much of the materials, new terms are often created)
7. Construct PRECIS string
8. Enter data generated in 1-7 on-line

General comments about PRECIS and its use at PLATO included:

1. The on-line catalogue is very user-friendly
2. PRECIS' natural language system represented an advantage over traditional subject classifications because much of the subject material documented is "newer than the traditional subject headings"
3. PLATO courseware is heavily concentrated in sciences and computer disciplines. PRECIS allowed the desired level of specificity in these areas
4. PRECIS is sometimes too specific; thus a list of about 30 general subject headings (curriculum titles) was developed
5. PRECIS training is difficult to acquire (Mary Dykstra at Dalhousie University is the only Canadian capable of giving training workshops in PRECIS).

Please refer to the following material from Control Data Corporation for a print copy of a typical on-line search.

Subject index as seen by a user who enters the term "mathematics."

Subject Index

Mathematics
see also
1. Algebra
2. Arithmetic
3. Calculators
4. Calculus
5. Combinations. Mathematics
6. Coordinates
7. Dimensional analysis
8. Equations
9. Factors
10. Fourier series
11. Functions. Mathematics
12. Geometry
13. Graphs
14. Matrices
15. Numbers
16. Numerical analysis
17. Numerical methods
18. Permutations
19. Probability theory
20. Ratios

*** NEXT for more ***

Type a few letters of a new Subject or a number > NEXT

NEXT/BACK to move SHIFT-BACK to exit

We'll assume the user chooses "games".

Subject Index

Mathematics
see also
1. Statistical analysis
2. Trigonometry
3. Vectors. Mathematics

4. Mathematics
5. Arrays --for elementary students
6. Sets. Distributive law
7. --for adult basic education
8. --for chemistry
9. --games

10. MATHEMATICS, advanced. Academic library

11. MATHEMATICS, advanced. Plato support library

12. MATHEMATICS, elementary. Academic library

13. MATHEMATICS. Basic skills library

14. MATHEMATICS. General Ed. Dev. library

*** NEXT for more ***

Type a few letters of a new Subject or a number » 9

NEXT/BACK to move SHIFT-BACK to exit

Subject List Index

Subject:
  Mathematics
    --games

 1. Arithmabattle
(881) FILENAME: Ømoonbattl   LIBRARY TYPE: B2

 2. Beehive
(554) FILENAME: Øbees   LIBRARY TYPE: B1

 3. The Coconut Story
(143) FILENAME: Øcocos   LIBRARY TYPE: B2

 4. Darts
(552) FILENAME: Ødarts   LIBRARY TYPE: B1

 5. Decimal darts
(553) FILENAME: Øddarts   LIBRARY TYPE: B1

 6. Decimal pinball
(663) FILENAME: Øpind   LIBRARY TYPE: B1

*** NEXT for more ***

Type a number for more information > 552

NEXT to move SHIFT-BACK to exit

This is the entry the user sees.

Darts

BY: Sharon Dugdale, David Kibbey, Barry Cohen,
Plato Mathematics Project
University of Illinois

COPYRIGHT DATE: 1977 FILENAME: ødarts
LIBRARY TYPE: Academic

This learning activity is part of the fractions curriculum developed by the PLATO Mathematics Project at the University of Illinois. The exercise consists of a vertical number line with balloon illustrations placed at different locations. To burst the balloons, students enter the whole number, fraction or decimal number that corresponds to each balloon.

(a) Further Information (b) Authors

Press the letter of the option you wish to select.
» a

LAB to try this item
SHIFT-NEXT/SHIFT-BACK to move BACK to exit #552

Further Information

ESTIMATED LENGTH: 40-45 minutes
100% CAI

INTENDED AUDIENCE: Elementary math students.

DESCRIPTION:

This learning activity is part of the fractions curriculum developed by the Plato Mathematics Project at the University of Illinois. The exercise consists of a vertical number line with illustrated balloons placed at different locations. The distance between the numbers on the vertical line and the size of the balloon determine the complexity of the problem. Difficulty adjusts to the students performance. To burst a balloon the student enters the whole number, fraction or decimal number corresponding to the position of the balloon. Numbers are entered on a trial and error basis and the balloons may be burst in any order until there are none left.

The exercise may be carried out with or without negative numbers.

Press NEXT to continue

BACK-go to previous page SHIFT-BACK go to options index
LAB to try this item

This is the same entry as seen in the database editor.

963 words left

Catalog of Available Courseware
(index)

Master Card #552

a. Title*
b. Authors*
c. Author Affiliation*
d. COPYRIGHT date*

e. Main File Name*
f. Demo File Name
g. Related Files

h. Short Abstract*
i. Long Abstract*

j. Subjects*
k. Package Mode
l. Library Type*

m. General Ordering Info
n. General Ordering (cont)
o. text3
p. text4
q. text5
r. text6
s. text7
t. text8

Press LAB to see mastercard

SHIFT-COPY to store any changes
SHIFT-DATA other options

* = Data Entered

LAST ED: reina/coserv 02/03/78 11.03.30.

Further Information

GOAL:

Give practice locating fractions and mixed numbers on the number line.

Press NEXT to return to options

BACK-go to previous page SHIFT-BACK go to options index
LAB to try this item

These are the strings for this entry.
"Academic Library" is our CDC price category.

"MATHEMATICS" (in caps) is a broad subject heading

```
  SUBJECTS
1 Decimals
    --for elementary students
2 Fractions
    --for elementary students
3 Number lines
    --for elementary students
4 Elementary students
    Decimals --for elementary students
5 Elementary students
    Number lines --for elementary students
6 ACADEMIC LIBRARY
    Mathematics, elementary
7 Elementary students
    Fractions --for elementary students
8 MATHEMATICS, elementary.  Academic library

  Option (a#,r#,d#,f,b):  »
```

```
   SUBJECTS
 9 Mathematics
     --games
1Ø Games
     Mathematics




   Option (a*,r*,d*,f,b):  ❯
```

This is the first page of the lesson itself.

DARTS

Sharon Dugdale
David Kibbey
Barry Cohen

Press NEXT to play
HELP to see the rules
DATA for information

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by the Board of Trustees of the University of Illinois

The on-line catalog uses a database manager developed specifically for this application. The catalog is designed to be accessible to any user of the PLATO system and thus must be "user friendly." It is electronically linked to identical databases on other PLATO systems, and updating takes place on a daily basis.

Customers who work with the catalog deal with some issues that are perhaps similar in nature to those faced by the user of a conventional library. The courseware library, like the conventional library, may not have all the materials a customer would like. The customer must work with the available indices to the courseware library, similar to the conventional library's card catalog, to locate the desired materials.

But, unlike the user of a conventional library, the customer must use a computer terminal and an on-line catalog to locate materials. A new customer is likely to use the catalog soon after learning to sign on to the system, and the catalog is an excellent tool for learning one's way around the system. It is important that the catalog be easy to learn for a customer who may never have used a computer system before.

The PRECIS system has been used for the on-line catalog since its inception. It was chosen over other systems such as Library of Congress for a variety of reasons, including undoubtedly the fact that the librarian who made the decision was familiar with PRECIS through work she had done in India. Some of the other reasons for the choice are perhaps more valid:

PRECIS was developed specifically to take advantage of the use of computers, a particular consideration in our situation.

Research indicates that PRECIS can be adapted for languages other than English. PRECIS is currently used actively in French, and its use has been demonstrated in German, Danish, and Polish. Since the PLATO system is used all over the world, the multi-lingual capabilities of PRECIS were an important factor.[2]

PRECIS headings are developed using a system of logic based on rules of grammar and syntax. These "rules" for developing headings can be applied in a variety of situations, and indexers working separately have been shown to have developed remarkably consistent subject headings.[3]

PRECIS subject headings are developed based on the subject of the item being indexed, and the indexer is not required to work within a certain set list of subject headings. Subject headings can be added without limit, an important advantage for indexing a relatively new field like computer-based education.

- PRECIS is not widely used or taught in the US. It is therefore difficult to obtain training, and librarians trained in PRECIS are few and far between.
- Indexing in a consistent, coherent manner is a difficult task. The indexer's knowledge of the world is certainly not complete, and the vocabulary of the searcher and indexer are not likely to match.
- Our courseware is heavily concentrated in certain areas, particularly computer-related subjects, that require special subject matter knowledge for indexing.
- The PRECIS index in the on-line catalog is the only subject index of courseware available. PRECIS is not by nature a broad hierarchical sy[illegible], and users frequently

express a wish to look at broad subject categories, particularly when browsing, rather than the specific headings of PRECIS.

Use of the PRECIS system results in more entries for each item in the catalog than other commonly used systems, such as Library of Congress. This requires more computer storage space and may well result in longer retrieval times. More entries per item, however, increase the likelihood of the customer locating an item under a variety of subject headings.

POOR

QUALITY

ORIGINAL